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THE AMERICAN MUSEUM OF NATURAL HISTORY was established in 1869 to promote the Natural Sciences and to diffuse a general knowledge of them among the people, and it is in cordial coöperation with all similar institutions throughout the world. The Museum authorities are dependent upon private subscriptions and the dues from members for procuring needed additions to the collections and for carrying on explorations in America and other parts of the world.

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THE DUCK HAWK HABITAT GROUP.
Gallery Floor. Hall No. 308.

The American Museum Journal

VOL. IX

JANUARY, 1909

No. 1

THE DUCK HAWK, HACKENSACK MEADOW AND EGRET GROUPS.

THE JOURNAL presents this month photographs of three Bird Habitat Groups. Two of these, recently completed, are of special interest to residents of the vicinity of New York City. The first shows the Duck Hawk or Peregrine Falcon as it nests on the Palisades. This Falcon is famed for its fearlessness and strength of wing and talon. Among falconers the Peregrine was rated second only to the Gyrfalcon and no person of lower rank than an earl was permitted to own and fly one of these noble hawks. The Peregrine is found throughout the greater part of the world but is nowhere common. Near New York City it is known to nest only on the less accessible ledges and cliffs of the Palisades and Hudson Highlands.

The second local group illustrates the bird-life of our Hackensack Meadows in August. During this month, and in September, these marshes are the home of myriads of birds which come to them to roost and to feed. Swallows of several species are comparatively rare in the marshes during the day, but late in the afternoon they stream in by the thousand, coming from every direction and steering their flight toward some regularly frequented roost in the reeds. They leave early in the morning radiating to all points of the compass to scour the country for food. Red-winged Blackbirds, Bobolinks, now called Reedbirds, and Carolina or Sora Rail are attracted to the marshes by the wild rice which ripens about this time; and the last two are now killed in large numbers. In August the marshes are remarkable not only for their birds but also for their flowers. Marsh mallows, cardinal flowers, jewel-weed, sagittaria, pickerel weed, loose-strife, wild sunflower, hempweed, vervain, gerardia and many other species bloom so luxuriantly that one might imagine that nature was holding a flower show.

The third group shows part of a colony of the White Egret in a flooded cypress forest of South Carolina. This Habitat Group was added to the series early in the year, in fact the history of the accumu-

lation of Egret studies is reported in the JOURNAL for December, 1907. Both the birds and their haunt are singularly picturesque. The nests are high in the trees and look out over the waters of a swamp through ragged cypress sprays and festoons of "Spanish moss." This is the Egret that has been brought so near extermination by the plume-hunters. It is a matter for rejoicing that there still exists this large South Carolina rookery and, moreover, that it is within the precincts of a game preserve where continued protection is assured.

TWO NOTEWORTHY FOREIGN MUSEUMS.

TWO European museums of natural history, rather small and relatively recent in establishment, are nevertheless peculiarly noteworthy. This is according to the impressions of Mr. James L. Clark, of the Department of Preparation and Installation, who spent the summer of 1908 abroad. The institutions in question are the Musée de Tervueren, or Congo Museum, just outside of Brussels, and the Senckenberg Museum at Frankfurt; and their prominence is the result of methods of installation, displaying objects in direct relation to their environment or to industry.

The Musée de Tervueren is an unpretentious one-story building with its two main halls devoted to the zoölogy and ethnology, respectively, of the Congo Free State. The hall of zoölogy contains many rare mammals, birds and fishes, several okapi of different ages making perhaps the most striking exhibit. It is the hall of ethnology, however, that claims emphatic admiration in Mr. Clark's opinion. The lighting is from above. Each specimen is well placed and is accompanied by photographs illustrating action or use. The general arrangement is in alcoves, where are shown various phases of every day life. In the alcoves devoted to home life, for instance, straw mats and implements and utensils of the hut are arranged on the walls as a background; large pieces, such as stone pestles, or models of the huts, are set on the floor; while a life-sized family group is made to occupy the central space. The figures of these groups are beautifully modeled and executed in plaster, cleverly painted, and are clothed in the genuine wearing apparel of the natives. The people are represented in action, grinding grain or



THE EGRET HABITAT GROUP.
Gallery Floor. Hall No. 308.



THE HACKENSACK MEADOW HABITAT GROUP.
Gallery Floor. Hall No. 308.

making ornaments, as the case may be. Finally, above the alcove exhibit, mural paintings of an entire settlement show the village life. Thus is told in a comparatively small space a complete story of Congo home life in a manner highly instructive and artistic as well.

The Senckenberg Museum at Frankfurt is in connection with the University. The building is modern, well lighted and provided with a large hall equipped for lectures and study. A group of African antelope with a painted background to show environment proclaims the enterprise of the institution and the tendency of its work. The large *Diplocodus* presented by the late Mr. Morris K. Jesup, while president of the American Museum of Natural History, stands in the main foyer.

The world to-day demands not only that the modern museum shall exhibit a multitude of rare and splendid specimens for the use of scientists and students, but also that it shall so install these specimens that they will make a vivid appeal to the ordinary observer, forcefully portraying stages in the evolution of the material world and in the history of civilization.

THE INTERNATIONAL TUBERCULOSIS EXHIBITION.

UNDER the auspices of the Charity Organization Society of the City of New York, the International Tuberculosis Exhibition opened November 30th in the new northwest wing of the Museum. It immediately proved its power to attract. By the close of the fourth day it had been visited by 65,000 people, and before the end of the first week by one-third of the half-million attendance expected by the society for the whole period of six weeks.

So admirably is the exhibition organized that it readily permits comparative study. The extensive German display, prepared under the auspices of the Imperial Board of Health of Berlin, stands mainly for treatment and cure, as do also the exhibits of Switzerland, Hungary and several other foreign nations, while Ireland's notable campaign under the Women's National Health Association has been aimed toward an education that would bring about prevention.

The keynote of the American exhibits also is prevention. Those of Pennsylvania and Rhode Island are realistic in the presentation of actual

living rooms to contrast the conditions promoting tuberculosis and the conditions that should obtain. A part of New York's exhibit shows the disastrous effects of over-crowding under adverse light and air conditions, comparing models of old tenements and those built under the new law and bringing to mind the striking features of the "Congestion of New York" exhibition held here last winter and the Tuberculosis exhibition of three years ago. Massachusetts gives a study of the industrial aspect of the disease, showing photomicrographs of dust and dust-clogged lungs, and making plain the need of efficient protection for workers in horn and celluloid, steel, iron, felt and other materials.

A prominent place at the south entrance is occupied by the exhibit of the New York Charity Organization Society's Committee on the Prevention of Tuberculosis. This Committee at the recent International Congress in Washington shared with Ireland the first prize of \$1,000 for the best evidence of effective work. Just to glance through this Committee's mass of free literature put forth in Yiddish, Italian, Bohemian, Swedish, French, German and English is to gain a realization of the comprehensive character of its work.

New York City has been fortunate in a coöperation of officials and physicians, and, in the opinion of Dr. Robert Koch, has a better organization for the prevention of tuberculosis than any other city in the world. In 1886, the death rate from tubercular diseases was 4.42 per 1,000; in 1907, it was 2.42 per 1,000, a decrease of more than 40 per cent. Of the 14,000 free beds for tuberculosis patients in the United States, 25 per cent are in New York City. But, as was emphasized at the meeting that formally opened the exhibition, conditions in New York can never become ideal, and tuberculosis as rare as smallpox, until there is a trio of forces at work — officials, physicians and an enlightened public. Hence the value of the Tuberculosis Exhibit as an educative force in counter-acting habit, ignorance and prejudice; hence the place of the exhibition within the walls of the American Museum of Natural History and its classification with other evidences of increased knowledge and municipal progress, such as playgrounds and free baths, parks, schools, museums and free public lectures.

A review of the whole exhibit, or of even a part of the whole, convinces one that tuberculosis is a preventable disease, that the 1,095,000 lives sacrificed to it each year (200,000 in the United States, 14,406 in New York State in 1907) are an unnecessary loss. It is the human interest

in this stupendous fact that holds the visiting throngs of whatever station in life to earnest study of alcove after alcove. The exhibition also makes it clear that, in most parts of the world at least, the fight against tuberculosis is well on. At the same time, it suggests even more definitely that the prevention of tuberculosis must be a prevention of infection, and that therefore the manner of the warfare must be segregation.

It is interesting in this connection to compare tuberculosis and leprosy. Both are caused by bacilli whose growth produces local tissue changes; both may have a long period of latency; both are protracted in course; both lack evidence of hereditary predisposition. Out of all expert discussions, this fact remains the final issue: that a complete stamping out of the white plague can never take place, no matter how resistant to tubercle bacilli the populace can be made, except by segregation of advanced cases. This conclusion is reached not only by analogy with diseases like leprosy, nor only by a study of the pathology of the disease, nor only by experimentation with cattle by which extermination of tuberculosis was effected in numerous herds in one generation by segregation, but also by a comparison of the actual experience of various countries. This comparison shows institutional care rather than any condition of living or industry, the influence that remains in constant relation to the amount of tuberculosis existing; therefore this institutional care must be the predominant influence. A knowledge of this adds new force to a prominent feature of the exhibit,—models of hospitals and sanatoria, such as those designed for the new buildings to be put up at the Henry Phipps Institute, Philadelphia. The visitor searches for facts, not merely of structure, but likewise of organization and maintenance of such institutions. How many will be privately endowed? How many should be erected and supported at the expense of state or nation? These are questions that must have practical answers in the near future. It is computed that if every consumptive now dying in the state of New York were given hospital care, the number would be about one-half of the insane supported at public expense.

Man's infection from bovine tuberculosis is given emphasis in various exhibits, particularly in the pathological work presented by the Bureau of Animal Industry of the United States Department of Agriculture, in the laws of the New York Department of Health with regard to the city's milk supply, in a demonstration of the pasteurization of milk, and in the equipment of a model dairy and model cowshed shown in

temporary structures just outside the north entrance to the exhibition. It must be conceded, however, that among physicians there exists a difference of opinion, relatively unimportant in its practical bearings, concerning the matter of man's infection from cow's milk. Many believe that milk is a minor vehicle of infection for adults, though a potent one in the case of children. In fact, the controversy that arose at the Congress of 1901 as to the identity of human and bovine tubercle bacilli is still an unsettled scientific question, with Dr. Koch maintaining the distinct character of the two germs but allowing the possibility of man's infection from bovine bacilli.

The International Tuberculosis Exhibition must be admitted to be of far-reaching significance. It stands for increased knowledge of nature, of the relations between the hosts of the microscopic world and the health of man; it stands for social and economic progress; and, happily, it means for the future a closer union between men of science and men of affairs. Besides accomplishing its main object, it is certain to bring about, in general, more hygienic ways of living, broader ideas of the work that should be done in health-control by city, state and national governments, and a more practical recognition of the obligations of mutual helpfulness.

The exhibition will be open to the public until January 10. Numerous mass meetings and special conferences are being held by physicians, medical students, nurses, social workers, labor unions, street railway employees and others, with announcements in the daily papers of the dates of these meetings and the programmes of speakers.

AN ETHNOLOGICAL TRIP TO LAKE ATHABASCA.

DURING the summer of 1908, by arrangement between the Museum and the New York Academy of Sciences, I undertook an ethnological expedition to the Chipewyan Indians of Lake Athabasca. Leaving New York on the 5th of May, five days' travel brought me to Edmonton, probably the greatest fur-mart of the world and the northernmost point that can be reached by rail. It was at this place, in the office of the Hudson's Bay Company, that I completed my camping outfit and procured the two articles considered the most essen-

tial parts of a Northland traveler's equipment, a mosquito bar for protection at night and a netting for day use. After leaving Edmonton two days' stage journey found me at Athabasca Landing, the last post office and the head of the Arctic inland water-route.¹

Here, I joined Captain Kelly of the Hudson's Bay Company, who was prepared to start down stream with a fleet of seven scows bearing the yearly provisions for all the Company's northern trading posts. Each boat was manned by several oarsmen, who rowed after the fashion of the old Roman galley-slaves, rising from their seats at each stroke, and by a steersman who manipulated a heavy sweep. For several days



THE "GRAHAME" ON LAKE ATHABASCA

we alternately rowed and drifted down the Athabasca River, our half-breed crew whiling away leisure time with a hand-game similar to our "button, button, who's got the button."

By the 19th of May we were only a short distance above the Grand Rapids of the Athabasca, and, owing to the extreme shallowness of the water and the numerous rocks in the river-bed, the oarsmen were obliged to punt instead of row. At the Grand Rapids, the river is divided into two channels by an island nearly a half mile long. The

¹ Dr. Lowie's route may be traced by studying the map on page 102 of the JOURNAL for November, 1908.

western of the two channels is wholly impassable, but the eastern channel can be traversed, provided boats have been lightened of their cargoes. Accordingly we removed our freight and baggage to the shore, transporting them the length of the island in hand-pushed carts or on our backs, and steered the emptied scows through the shoals along the eastern bank. Finally, at the far end of the island, we reloaded the boats, having consumed six days in the tedious operation.

The next hundred miles gave an almost continuous succession of rapids, which, however, our scows passed without damage. We reached



HEADMAN



"OLD CATHARINE."

Fullblooded Chipewyan.

Ft. McMurray, the objective point of the scows, on the 28th of May. Here the freight was unloaded and piled on the bank to await the arrival of the Hudson's Bay Company's steamer, the "Grahame," which plies irregularly between Ft. McMurray and Smith's Landing. Captain Kelly then turned back, leaving me and two half-breed watchmen with three days' supply of provisions — which it turned out we had to husband with care, since the steamer did not appear for eight days. The remainder of the trip presented no unusual features, and on the 8th of

June, I landed at Ft. Chipewyan, on the northwestern shore of Lake Athabasca. Here I found good opportunity for the investigation I had planned, since this settlement is one of the chief rendezvous of the Chipewyan Indians.

These Indians are a branch of the Athabascan, or Déné stock, the largest linguistic family of North America, embracing the Hupa of California and the Apache and Navajo of the Southwest, as well as the aborigines of the Mackenzie River basin. They do not live on reservations, but hunt and fish in primitive fashion around the shores of Lake Athabasca, Lake Claire and the Slave River. Pelttries are offered to the Hudson's Bay Company and to rival "free-traders" in exchange for clothing and provisions; but, even with these supplies, considerable hardship is often encountered during the long winters.



TALLEST CHIPEWYAN MEASURED.
Height 6 feet 2 inches.



CHIPEWYAN BOYS.

Many valuable photographs were secured at Ft. Chipewyan and at Fond du Lac near the eastern extremity of the Lake. The physique of the Chipewyan differs considerably from the Sioux prototype on which popular conceptions of Indian appearance are modeled. Their cheek-bones are, on the whole, less prominent; and, as the hair of the face is not plucked out, fairly heavy moustaches are common and whiskers also occur. Though not averaging below five feet seven inches in height, the natives of the Athabasca district are short as compared with the Plains Indians.

Ethnologically, the Chipewyan were found to share two fundamental traits of all their Athabascan congeners: (1) great simplicity of organization and (2) extraordinary susceptibility to extraneous influences. They do not practise any elaborate ceremonials, nor is there any strongly centralized executive power; esoteric fraternities and age-societies are lacking. Shamanistic activity, however, flourished until recent times, and within the memory of men still living at the fort, there resided at Fond du Lac a medicine-man, who, according to the belief of the natives, could transform himself into a wolf and thus hunt the moose. In their mythology, the Chipewyan betray a strong family resemblance to their northern congeners. There are tales of giants, of the man in the moon, of a weird foundling who by his magical powers aided his people in times of famine, and of a powerful shaman who avenged his father's murder and destroyed all his enemies until the time when he himself perished by an accident. The receptivity of the Chipewyan is shown by the strong influence exerted by the Catholic missions and the Hudson's Bay Company, both of which have profoundly modified primitive conditions. Other instances in point are the adoption of a complete Cree cycle into their mythology, and the imitation of their southern neighbors in the Cree tea-dance, a purely social diversion.

In July, an opportunity offered to return to civilization with a free-trader. Our little craft was towed for three days by a small tug through 172 miles of lake and river to Ft. McMurray. There the eight men of the crew were harnessed to a tow-line to pull the boat up the remaining 265 miles of the Athabasca River. At each of the rapids, we were obliged to get out and commence an "obstacle-walk," at times for several miles, now clambering up a five-foot ledge of limestone, now trying to get a foot-hold on a slippery earth-bank, dodging lodged deadfalls, and jumping across logs in our way. Every night we camped

ashore, pitching our mosquito-bars on wet soil or dry as the case might be. At five o'clock each morning we rose, bundled up our bars and bedding, re-embarked, and continued our journey. Twenty miles' journey we considered a good day's work. As we were not fortunate enough to sight any moose, our diet was a well-nigh uninterrupted combination of bacon, bannocks and beans. We made the trip, as a whole, in relatively short time, covering the total distance of 437 miles in seventeen days, but it was with a sense of great relief that we ultimately sighted the wharves and buildings of Athabasca Landing. From there we took the stage to Edmonton, and were again in railroad connection with the outside world.

R. H. LOWIE.

MUSEUM NEWS NOTES.

THE HON. MASON MITCHELL, to whom the departments of Anthropology and Mammalogy are already indebted for much valuable material from eastern Asia, presented to the Museum in December an exceptional series of ethnological specimens from Tibet, together with some choice things from China and India. An extended notice of this acquisition is reserved for a future number of the JOURNAL.

THE Department of Anthropology has recently received a guanaco skin cape as a gift from Mr. Charles H. Townsend, who obtained it some years ago at Punta Arena, Strait of Magellan. The guanaco is a mammal related to and somewhat larger than the llama. The hair of the adult is coarse, so that old skins are not suitable for use in the manufacture of garments, but the hair of the young is fine, and animals probably not more than two weeks old are slaughtered for skins to be used in capes like the one just received. The skins are sewed together with ostrich sinew. The Tehuelches of the continental side of the Strait wear the robe with the hair next to the body, while the Onas across the water from them, where the rainfall is much greater, turn the fleece side out, since the hair readily sheds water.

THE following members have been elected since the last issue of the JOURNAL: Life Members, MESSRS. GEORGE SHIRAS, 3D, JAMES W.

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LECTURE ANNOUNCEMENTS.

LEGAL HOLIDAY COURSE.

Fully illustrated. Open free to the public. No tickets required.

Lectures begin at 3:15 p. m. Doors open at 2:45 p. m.

Two lectures remain to be given in this course:

New Year's Day, January 1, 1909.

“Florida Bird Life.” (Moving pictures.) By FRANK M. CHAPMAN.

Washington's Birthday, February 22, 1909.

“Some of the Food and Game Fishes of the Eastern United States.—Habits and Methods of Capture.” By ROY W. MINER.

COLUMBIA UNIVERSITY COURSE.

JESUP LECTURES.

GIVEN in coöperation with Columbia University.
Wednesday evenings at 8:15 o'clock.

Continuation of a course of lectures on light by PROFESSOR RICHARD C. MACLAURIN of Columbia University.

January 5.—“The exact laws of reflection and refraction and their bearing on the construction of optical instruments.”

January 13.—“Optical properties of crystals.”

January 20.—“The principle of interference and its explanation of various color phenomena.”

January 27.—“The measurement of light waves and the theory of diffraction.”

February 3.—“Some relations between light and electricity.”

PEOPLE'S COURSE.

GIVEN in coöperation with the City Department of Education.
Tuesday evenings at 8 o'clock. Doors open at 7:30.

IAN C. HANNAH,— a course of six lectures on European relations with the Far East.

January 5.—“The East and the West and Their Different Ideals.”

January 12.—“China's Everlasting Empire.”

January 19.—“England's Eastern Empire.”

January 26.—“The Russian March Across Asia.”

February 2.—“Japan's Transformation.”

February 9.—“America as an Asiatic Power.”

Saturday evenings at 8 o'clock. Doors open at 7:30.

January 9.—PROFESSOR LAFAYETTE B. MENDEL of Yale University,
“Development of the Milk Industry.”

January 16.—HON. J. S. WHIPPLE, “The Adirondack Forest.”

January 23.—PROFESSOR LAFAYETTE B. MENDEL, “Growth and Beauty of Children.”

January 30.—WILLIAM L. HALL, “Forests and Waters.”

MEETINGS OF SOCIETIES.

Public meetings of the New York Academy of Sciences and its Affiliated Societies are held at the Museum according to the following schedule:

On Monday evenings, The New York Academy of Sciences:

First Mondays, Section of Geology and Mineralogy.

Second Mondays, Section of Biology.

Third Mondays, Section of Astronomy, Physics and Chemistry.

Fourth Mondays, Section of Anthropology and Psychology.

On Tuesday evenings, as announced:

The Linnæan Society of New York, The New York Entomological Society and the Torrey Botanical Club.

On Wednesday evenings, as announced:

The New York Mineralogical Club.

On Friday evenings, as announced:

The New York Microscopical Society

The programmes of the meetings of the respective organizations are published in the weekly *Bulletin* of the New York Academy of Sciences and sent to the members of the several societies. Members of the Museum on making request of the Director will be provided with the *Bulletin* as issued.

The American Museum Journal

EDMUND OTIS HOVEY, *Editor.*

FRANK M. CHAPMAN, LOUIS P. GRATACAP, WILLIAM K. GREGORY, *Advisory Board.*

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The Museum is open free to the public on every day in the year.



THE "SPOUT" OF A FINBACK WHALE. AUGUST 20, 1908.
Photographed from a distance of about one hundred yards.

The American Museum Journal

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No. 2

A SUMMER WITH THE PACIFIC COAST WHALERS.

THE recent establishment of several shore-whaling stations on the coasts of Vancouver Island and Alaska, has made possible a study of certain species of the large whales inhabiting the North Pacific Ocean. With the exception of a single work, "Marine Mammalia," written by Captain C. M. Scammon in 1874, these animals have remained almost unknown scientifically, and their relationship to the corresponding Atlantic forms, which have been carefully investigated by Dr. F. W. True, has never been satisfactorily determined. To secure data for a comparative study of the external and osteological characters of these whales, I left New York late in April on a Museum expedition to the west coast whaling stations.

The species commonly taken there are the Humpback, Sulphur-bottom and Finback, the first-named in largest numbers. All belong to the group known as Finwhales, having short, coarse baleen or "whalebone" and thin blubber. Before the invention of the harpoon gun in 1864, they were seldom hunted, because the comparatively small yield of oil and whalebone and the great speed of the animals in the water, together with their tendency to sink when killed, rendered them *persona non grata* to the men in the small boat. To-day, however, they are being taken at a rate which threatens their speedy extinction.

The study of whales is beset with many and unusual difficulties. Their great size, alone, is a serious obstacle. If one wishes to do such an ordinary thing as to turn over a fin for observation of the color or markings of the other side, he must have the assistance of not only one man but several. Thus the naturalist is totally dependent for the success of his studies upon the men about him, in fact, they make or ruin his work by their attitude toward it.

Fortunately, I met with most courteous treatment from the owners of the stations, and my thanks are due to the Pacific Whaling Company and Dr. Rismuller of Victoria, B. C., and to Captain I. N. Hibbard of

the Tyee Company, Alaska; also to the managers of the several factories, Messrs. J. Quinton, S. C. Ruck and V. H. Street. These gentlemen, by their generous coöperation in extending the courtesies of their stations and vessels, rendered my stay pleasant as well as profitable.

The months of May and June were spent on the west coast of Vancouver Island, at Sechart, an old Indian village site on Barclay Sound. Although the weather was bad, Humpback whales were plentiful, and whenever a fair day broke the monotony of rain and fog, the following morning we were sure to find four or five Humpbacks floating breast-up at the end of the wharf. On such a day there was need for rapid work. Little could be done until the whales were drawn out of the water upon the "slip," as the long inclined platform is called; then photographs, detailed measurements and descriptions had to be secured before the animal was denuded of its blubber covering. The ease and quickness with which a large whale weighing, perhaps sixty or seventy tons, can be handled by means of the steam winch is almost incredible; within fifteen or twenty minutes from the time the animal is taken from the water, little remains of the blubber on the upper side. In order to determine the extent of individual variation in color and external characters, each specimen was carefully described, a "standard" set of measurements taken, and as much additional matter recorded as time and circumstances permitted. While the flesh was being stripped from the bones, there was opportunity for study of the fresh skeleton, and it was possible to obtain many facts relating to variations in the vertebral column, pectoral limb, ribs and other parts. Later many of the bones were measured and photographed. Thirty Humpbacks in all were examined at Sechart, and the skeleton of an exceptionally fine specimen, including its complete set of baleen, was secured.

At the end of June, I proceeded one hundred miles up the coast to the station located in Kyuquot Sound, where Humpbacks, Sulphurbottoms and an occasional Finback were being taken. The weather conditions of the month of July were good, and the facilities for study enjoyed through the kindness of Mr. S. C. Ruck, manager of the station, were exceptional. As the result of one day's hunting, the steamer towed to the wharf two large Sulphurbottoms, one Finback and three Humpbacks, a record catch which raised the total number to twenty-six whales for the week.

At Kyuquot an opportunity offered for work upon a large Sperm



A HUMPBACK WHALE EMERGING FROM BENEATH THE STEAMER.
The blowholes or nostrils are open, since the animal is drawing in its breath.



THE TAIL OF A DIVING HUMPBACK.



THE WHALE HARPOON GUN, READY TO FIRE.



THE GUN HARPOON IN THE AIR.

Showing, besides harpoon and rope, the smoke and sparks of the discharge, bits of burning wadding and the back of the whale.



AN EIGHTY-FOOT SULPHURBOTTOM WHALE ON THE SLIP.

The animal is being drawn out of the water by means of a cable attached to its tail.



BREAST VIEW OF A LARGE SULPHURBOTTOM WHALE.

whale. Sperms are but rarely taken at these shore stations, and I was delighted at the unexpected good fortune. The whale was drawn upon the slip early in the morning, and ample time was given to secure a complete set of photographs and measurements, with a full description of the animal as a basis for a life-sized model to be prepared at the Museum.

The Sperm whale is a strange-looking creature, the great square-ended head having a size out of all proportion to the body and giving the animal a peculiarly shapeless appearance. The whole upper third of the head is devoted to an "oil-tank" containing the valuable spermaceti, which lies in a liquid state and may be dipped out after an opening has been made. Fifteen barrels of pure spermaceti were obtained from the oil-tank in the head of this individual, and twenty-five barrels more were secured from the fat surrounding the head. The total amount of oil, including the spermaceti and that obtained from the meat, bone and blubber, was ninety barrels.

Finbacks were taken at such infrequent intervals at Vancouver Island, that I decided to go to the station at Tyee, Admiralty Island, Alaska, where this species was said to be plentiful. Arriving there early in August, I found that the reports had not been exaggerated, for Finbacks were being brought in every day. I remained at Tyee about three weeks collecting a considerable amount of valuable data, and receiving the most hospitable treatment.

At each of the stations, some time was spent on board the whaling vessels, studying and photographing the animals in the water. Few students of the Cetacea have made attempts to record their observations with the camera. The discomforts of such work are many, and one must be constantly on the alert. Nevertheless, the study is most interesting, for the momentary glimpses of phases of whale-life obtained while the animals are above the water give fascinating hints of what may take place below the surface.

The whaling steamers which hunt from the shore stations are small steel vessels, having a maximum speed of ten or twelve knots per hour. Mounted on the bow, they carry a heavy cannon which shoots a harpoon having an explosive head or point called the "bomb." When the man stationed in the "barrel" at the masthead sights a whale, the vessel is sent at full speed in pursuit, and stopped on the smooth patch of water called the "slick" which invariably follows the whale's dive. Then begins a period of waiting until the animal re-appears. If the place has

been well judged, the whale may come to the surface almost under the vessel's bow. As the animal bursts into view, sending the spout high into the air, the captain swings the gun about, sights along the barrel and fires just as the dorsal fin appears above the water. At times the whale may rise actually under the boat. This happened on one of my trips, allowing me to secure a picture of considerable interest, showing the nostrils or blowholes widely distended during the act of inspiration.

When the whales were too far away for good photographs, I watched their movements with field glasses from the bridge or the "barrel" at the mast-head. From the latter position on several occasions, I saw the act of feeding. The animals eat a small crustacean (a shrimp) about three quarters of an inch in length, which at times floats at the surface of the ocean. When the whale has taken in a mouthful of water containing quantities of these minute animals, it turns on its side, letting the immense under jaw close over the upper, while the water spurts out in streams between the plates of whalebone. The fin and one lobe of the flukes are thrust into the air and even the full length of the body is sometimes exposed, as the animal rolls from side to side.

I was fortunate in securing a photograph of a large Finback whale while it was feeding, and of a Humpback which threw itself entirely out of the water. Other pictures show both species in the acts of spouting and diving. Thus many interesting observations on the habits and "home life" of these strange animals were given indisputable record by the aid of the camera.

ROY C. ANDREWS.

A PORTION of the central Hall (No. 204) of the second floor of the Museum has been fitted up expressly for children, through the generosity of subscribers to a special fund. Among the features of the Children's Room are live animals in aquaria and growing plants, as well as books, pictures and specimens which may be handled by the juvenile visitors. The room is under the direct care of Mrs. Agnes L. Roessler.

THE attendance at the Museum during 1908 was 1,043,562, the record attendance for one day being 63,256, on December 27, 1908. The International Tuberculosis Exhibition was visited by 753,954 persons from November 30, 1908, to January 17, 1909.



ST. PIERRE, MARTINIQUE. VIEW NORTHWARD FROM HOTEL WINDOW.
Rue Victor Hugo, the main street of the city, which has been cleared of volcanic
ash and other débris. In the background is Mt. Pelé. May, 1908.



ST. PIERRE, MARTINIQUE. SOUTHERN PART OF THE CITY.
View looking northward from the road to Le Carbet showing growth of vegeta-
tion over the city. Mt. Pelé in the background. May, 1908.

ST. PIERRE AND MT. PELE IN 1908.

READERS of the AMERICAN MUSEUM JOURNAL will remember that the Museum sent an expedition to Martinique and St. Vincent in 1902, directly after the beginning of the series of eruptions that made that year famous in the annals of vulcanology. The following year the Museum sent a second expedition to observe the changes that had taken place in the two volcanoes, particularly those at Mt. Pelé, Martinique, through the extrusion of the great "spine" that surmounted its eruption cone for nearly a year. Five years passed; the spine fell to pieces, entirely altering the form of the summit cone of Mt. Pelé; eruptions of débris entirely ceased in July, 1905, at Pelé, while there had been none at the Soufrière of St. Vincent after March, 1903; vegetation was asserting its sway over the devastated areas, and human occupation was advancing again toward the craters; hence it was determined to send a third expedition to the region to bring observations on the volcanoes up to date.

Leaving New York April 16, 1908, on the steamship "Guiana" of the Quebec Line, this time accompanied by my wife, I reached Fort de France, the capital of Martinique, Sunday, ten days later. Two days after this we took the ancient little coasting steamer "Diamant" for Le Carbet, an important town on the leeward coast about two miles south of the ruined city of St. Pierre. Le Carbet occupies the site of the most important settlement of the aboriginal Carib inhabitants of the island, and a shrine and cross within its borders mark the spot where Christopher Columbus is supposed to have first set foot upon Martinique in June, 1502.

From Le Carbet, we made the remainder of the journey by canoe, arriving at St. Pierre by ten o'clock with our various belongings and settling at the little "hotel" which has been built on the Rue Victor Hugo, the main street of old St. Pierre. This "hotel" boasts two guest rooms and a dining room of diminutive size, and harbors a store where malodorous salt cod fish and other viands are sold to passers-by; nevertheless, one can stay several days very comfortably at the little hostelry, and it makes convenient headquarters for excursions.

The ruins of St. Pierre look like those of a place destroyed a century ago, rather than only a few years since. Many walls that were standing on the occasion of my second visit, in the spring of 1903, have fallen,

and many streets and buildings that were plainly distinguishable then are now completely obliterated as to surface indications. Earth has been washed down abundantly from the denuded surrounding bluffs and hill slopes, bringing grass and other seeds with it, and the whole city, except for a few clearings, is covered with vegetation. The knotty bunch grass characteristic of the Lesser Antilles is flourishing luxuriantly, together with the castor-oil plant (*Ricinus communis*) and many bushes strange to northern eyes. Here and there a mango or other tree that lived through the terrible eruption blasts and the consequent burning of the city is struggling to recover from its injuries and gives a little grateful shade to the stray wanderer amid the ruins and to the cattle that are being pastured where once stood the cathedral, the hospital, the theatre, the government buildings and the stores and residences of a wealthy city.

The Rue Victor Hugo has been cleared of ash and débris for its entire length from south to north; so too have been the streets connecting this old artery of travel with the road to Morne d'Orange and the south-east, with that to Fond St. Denis and thence to Fort de France and with the route to Morne Rouge and the rich sugar and other estates of the northeastern parts of the island. The clearing of these streets was made necessary to meet the requirements of the great agricultural district that was naturally tributary to St. Pierre and that now must ship out its sugar, rum and other produce by the old route. To accommodate this traffic and the travel between the region and Fort de France, a pier has been built at Place Bertin near the hotel, and regular semi-weekly steamboat service with Fort de France began in June. The Rue de l'Hôpital also has been cleared, giving access to the headquarters of the police, established in the massive ruins of the old bank building, and the Rue Victor Hugo has been cleared southward to give unobstructed connection with the road to Le Carbet and beyond.

On May 1, we embarked in a canoe for the mouth of the Rivière Blanche to camp in its gorge, down which came the first as well as all the rest of the long series of incandescent dust-laden steam-clouds that burst from the great crater and cone for more than three years. Establishing camp on a little sand plain about two miles from the coast and twelve hundred feet above the sea, I turned my attention first to the neighboring fumaroles or steam vents that extended in an irregular line a quarter of a mile or more toward the crater. The vents nearest the crater registered a temperature of 581 degrees Fahrenheit, while 50

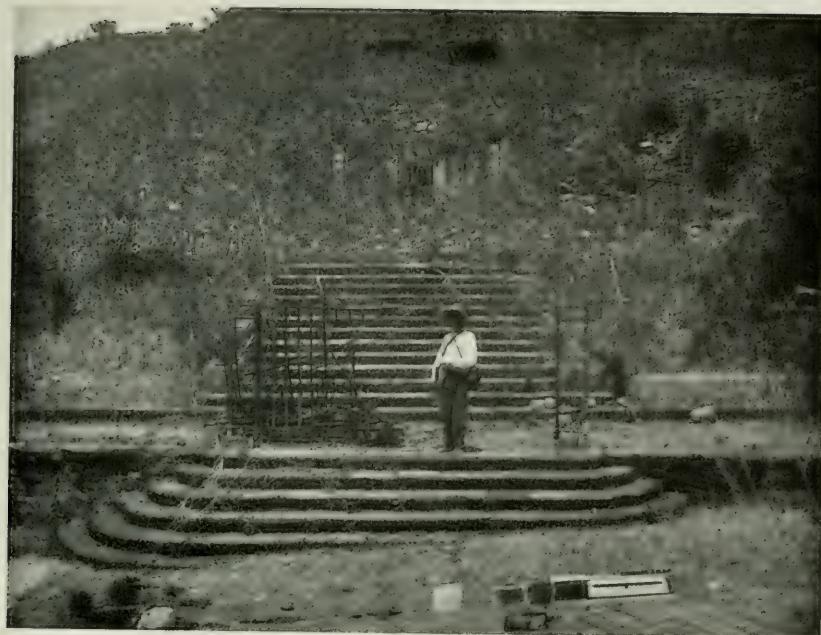


ST. PIERRE, MARTINIQUE. GENERAL VIEW OF RUINS. MAY, 1908.

Looking south-southwest. The prominent ruin in the foreground is part of the military hospital.



ST. PIERRE, MARTINIQUE. RUE VICTOR HUGO, LOOKING SOUTHWARD. MAY, 1908



ST. PIERRE, MARTINIQUE. RUINS OF THE THEATRE. MAY, 1908.



MT. PELE, MARTINIQUE. THE WEST SIDE OF THE VOLCANO IN MAY, 1908.

The line of knolls in the middle ground is the fumarole area of the Rivière Claire. The camp site is about 1200 feet above the sea.

yards from our tents were fumaroles that were just right for use in cooking and we employed one for the purpose. Our camp was a "dry" one, since we were four or five miles from the nearest source of fresh water.

The western and southwestern sides of the mountain present a scene of utter desolation. The sloping plain formed by the débris-filled gorge of the Rivière Blanche is thickly strewn with boulders and angular rock-fragments of all sizes, with here and there a little patch of sand; but not a sign of life, not even a blade of grass or so much as an ant, is visible anywhere. The surrounding hillsides were scored so often and so deeply by terrific blasts from the crater that they too are barren of vegetation. As one goes away, however, from this zone of greatest activity, moss, grass and other vegetation gradually appear in protected and otherwise favorable spots, while upon the other sides of the mountain where the scoring did not take place the slopes are green to the very summit, and large vegetation is rapidly making its way back into the devastated area.

Five days was enough for my work on the southwest side of the mountain, and then we moved camp to the basin of the Lac des Palmistes, the old summit plateau of Mt. Pelé, about 4,000 feet above the sea. Here, in the midst of clouds and buffeted by the heavy trade winds, we set up our tents for another stay of five days, with the idea of being able to improve every moment while the summit might be free from clouds, for the top of Mt. Pelé is densely veiled more than nine-tenths of the time. The recent eruption of the volcano was remarkable partly through the formation in the old crater of a vast new cone of solid rock (not débris) surmounted by a wonderful needle, or spine. The new feature was formed by lava which welled up through the vent, but which was in such a viscous condition that it solidified as it came and therefore rose into the air instead of running down hill. Minor explosions blew away the southwest and northwest quarters of the top of this cone leaving the great spine as a residue. At its maximum development in May, 1903, the point of this spine was 5304 feet above the level of the sea.

The mass, however, was brittle and was rifted in every direction through strains due to contraction. It could not maintain its position and therefore fell to pieces. One may see the great fragments, fifty to sixty feet across, now lying at the base of the new cone in the spiral valley between it and the wall of the old crater. Nearly 900 feet of the mountain top thus fell away, and the present summit is 4,444 feet

above sea level, or only sixteen feet higher than the old Morne Lacroix that once formed the highest part of the mountain, but which was largely destroyed by the eruption.

It is not a difficult matter now to climb the north side of the new cone, but its slope is 37 to 40 degrees from the horizontal, so that the rock fragments composing it are so loose that a slight jar starts them down hill, rendering foothold uncertain and the advance of a party dangerous to the lower members of it. In the top of the new cone, there are great fissures within which the temperature is high. In a branch of one of them my electric pyrometer gave a reading of 515 degrees Celsius, or 959 degrees Fahrenheit. After a shower, steam issues abundantly from the numerous fumaroles of the cone, but between times there is said to be no cloud of vapor, and as far as known no ash has been thrown out since the summer of 1905. The activity of the volcano has been gradually though intermittently decreasing since the great outburst of August 30, 1902, which was the most severe of the whole series, and there seems to be no present indication of another eruption.

EDMUND OTIS HOVEY.

THE INDIANS OF CALIFORNIA.

THE Department of Anthropology has arranged a new exhibit in the series illustrating the chief culture types of North America. The present exhibit, that of the Indians of California, makes the third of the series now in place, the other two, those of the Eskimo and the Indians of the Plains, respectively, having been previously opened to the public. The new exhibit is to be found in the West Hall of North American Types (No. 102 of the Ground Floor).

While the Indians of California are somewhat uniform in their habits and customs, they may nevertheless be divided into three groups: (1) Those of central California, characteristic of the type and represented in this exhibit by the Maidu. (2) Several tribes in northern California, represented in the exhibit by the Yurok. These, while having most of the characteristics peculiar to the Indians of California, have also customs and habits borrowed from Indian tribes farther north. For instance, the Yurok and several other northern tribes lived in rectangular houses with gable roofs, a style borrowed from the houses of Oregon and Washington. (3) Tribes in the southern part of California, represented



MT. PELE, MARTINIQUE. SUMMIT OF NEW CONE LOOKING S. 60° W.

The camp is on the site of the Lac des Palmistes, about 4,000 feet above tide. The remains of Morne Lacroix are seen at the right just above the tent. May, 1908.



MT. PELE. THE SPINE OR OBELISK IN MARCH, 1908

From practically the same spot as the picture above. The spine rose 5,304 feet above the sea, or 860 feet higher than the top of the present cone.

in this exhibit by the Mission Indians. These took over many practices from the Pueblo and other Indians of the southwestern United States, the making of pottery, an art that was unknown among other Californian Indians, being an example of this.

While the above division can be made, we must understand that the distinctions are not absolute; in fact, the inter-relations of the three main culture types are shown by the existence of mixed types. The Shasta, represented in this exhibit, stand perhaps midway between the central and northern Californian types, emphasizing the fact that after all no hard and fast classification is possible where tribes occupy adjacent geographical areas.

One of the most characteristic features of Californian Indian life is the dependence upon vegetable food, the acorn in particular. Almost every people, whatever the degree of culture, has some food article which takes the place of bread and which is in reality the "staff of life." In California, a kind of bread is made of acorn meal. The various stages of this acorn industry are illustrated by a series of small models to show the gathering of the acorn, its grinding, its leaching by means of hot water, and its drying. In the northern part of California, where salmon are found, fishing is an important industry. A case is being fitted up to illustrate the native methods of catching and treating this fish.

From the artistic point of view, one of the most prominent facts concerning these Californian Indians is their skill in the manufacture of baskets. While basketry is fairly well represented in the present exhibit, it has been given special treatment in the hall above this, on the second floor of the Museum, where will be found a collection of baskets from several parts of California as well as from other regions in North America.

DR. HENRY E. CRAMPTON has been appointed Curator of the Department of Invertebrate Zoölogy in the Museum to fill the place made vacant by the resignation of Dr. William Morton Wheeler. Dr. Crampton has published extensively and is now making researches in experimental biology, under a grant provided by the Carnegie Institution. He will retain an official connection with Columbia University, where he has served as lecturer and tutor, instructor, adjunct professor and professor.

SCHOOL CHILDREN AT THE TUBERCULOSIS EXHIBITION.

THE two photographs on the opposite page show lines of school children entering the north and south entrances of the Museum. Between January 4 and 15 (ten school days) the Museum received within its doors six thousand children daily. Ushered, a thousand at a time, into the auditorium, they were given facts concerning tuberculosis and personal hygiene preventing it, and directions for study of the International Tuberculosis Exhibition. When dismissed from the auditorium, giving place to a second set of a thousand, they were guided through the exhibition, to watch the light that went out every two minutes thirty-six seconds showing how often someone dies of tuberculosis in the United States, to see dark, dirty rooms contrasted with light and clean ones, to examine many inviting tents for out-of-door living—one very amusing to them because it allowed a person to sleep with his body in the house and his head out of the window. Then from the exhibition the long lines filed into the Bird Group Halls and on to other parts of the Museum. There can be no doubt that the suspension of their school work and the unusual expedition, combined with the serious force of the impression received after reaching the Museum, brought before them with unwonted importance not only the social evil, tuberculosis, but also many matters of personal cleanliness and home sanitation.

* * *

The two weeks' educative work above referred to illustrates one of the large ways in which the Museum serves the people above and beyond its more specific work in science. That the Museum is practicable for direct use in lesser ways also is continually demonstrated. Recently inquiry came for a most resonant wood to be used in the construction of violins. Tests were made in the Forestry Hall, and Douglas spruce was chosen after opportunity for examination of five hundred North American woods. Later another inquirer sought wood absolutely non-resonant for use at the heart of a soundless typewriter. His tests in the Forestry Hall resulted in the choice of palmetto for his purpose. Another instance concerns Peruvian mummy cloths. Probably more than a thousand art students have visited the Museum within the past six years to copy patterns of these cloths or to study their coloring. Many of these students have become successful designers, and as a result numbers of our modern wall papers, rugs and other house-



PUBLIC SCHOOL CHILDREN APPROACHING THE NORTH AND SOUTH ENTRANCES OF THE MUSEUM TO VISIT THE INTERNATIONAL TUBERCULOSIS EXHIBITION.

The average number was 6,000 per day for two weeks.

furnishing goods show some sign of the color combinations and of the fish, bird and cat patterns peculiar to Peruvian mummy cloth. Reports of such instances of direct influence on the art and industries of the country might be multiplied indefinitely, sometimes the need entailing information about precious corals, or some tree advisable for planting in a commercial venture, or sometimes having to do with materials for an artist's sketch of a Sioux maiden, design of grotesque fish or quaint and unusual models for pottery and glass.

MUSEUM NEWS NOTES.

THE Museum is fortunate in having secured the John William Waters collection of ethnological objects from Fiji. The collection comprises about 1800 specimens, including household utensils and implements of war and the chase, made of stone, turtle shell and wood. Mr. Waters lived for forty years on the island, and his knowledge of the people and their customs enabled him to bring together this remarkable collection, the value of which is enhanced by the fact that it represents the life of the Fijians before they had become acquainted with iron and its uses.

THE following members have been elected since the last issue of the Journal: Life Members, MESSRS. HUGH HILL, J. S. MORGAN, JR., and HENRY S. MORGAN, MISSES JANE N. MORGAN and F. T. MORGAN and MMES. J. PIERPONT MORGAN, JR., and DAVIES COXE; Annual Members, MESSRS. A. PERRY OSBORN, A. F. TROESCHER, A. G. VETTER, P. S. TRAINOR, JACOB OLESHEIMER, WM. EDMOND CURTIS, JAMES W. GREENE, R. J. SCHAEFER, GEORGE E. CHATILLON, E. C. KLIPSTEIN, B. G. MEYER, A. C. BECHSTEIN, WASHINGTON L. COOPER, FREDERICK A. LIBBEY, CHARLES H. WEIGLE, C. B. ISHAM, EDWARD H. FLOYD-JONES, JESSE LANTZ and ALANSON P. LATHROP, DR. CHARLES K. BRIDDON, GENERAL HORACE PORTER, MISSES LOUISE D. VAN BEUREN and E. MABEL CLARK and MRS. JAMES A. RUMRILL.

DR. FRANK E. LUTZ has been appointed an assistant curator in the Museum. Dr. Lutz has been an investigator in the Carnegie Institution at Cold Spring Harbor and has published a score or more of papers on the general subjects of Inheritance and Variation.

MR. ALEXANDER PETRUNKEVITCH, an authority on American spiders, has become officially connected with the Museum in the capacity of Honorary Curator of Arachnida. This appointment was made by the Board of Trustees in appreciation of the invaluable service which Mr. Petrunkevitch has rendered the institution for several years through correspondence, exchange and the general enrichment of the collections.

LECTURE ANNOUNCEMENTS.

MEMBERS' COURSE.

The second course of lectures to members of the Museum and their friends will begin February 25 and will be devoted to the Conservation of Natural Resources. Details will be announced in a special circular.

LEGAL HOLIDAY COURSE.

Washington's Birthday, February 22, 1909, at 3.15 o'clock p. m.
No tickets required.

“Some of the Food and Game Fishes of the Eastern United States.—
Habits and Methods of Capture.” By ROY W. MINER.

Fully illustrated with stereopticon views.

COLUMBIA UNIVERSITY COURSE.

JESUP LECTURES.

Given in coöperation with Columbia University.
Wednesday, February 3, at 8:15 o'clock p. m.

The last of a course of ten lectures on light by PROFESSOR RICHARD C. MACLAURIN of Columbia University.

“Some relations between light and electricity.”

A COURSE IN BIOLOGY.

Arranged by the Biology Departments of the Normal College and the High Schools of Manhattan. Illustrated with stereopticon views.

Thursday afternoons at 3:30 o'clock.

January 14.—"American Forests and Their Uses." By GEORGE H. SHERWOOD.

February 18.—"Our Atlantic Fisheries." By DR. HERMON C. BUMPUS.

March 18.—"Public Health." By DR. THOMAS M. DARLINGTON.

April 15.—"Natural History of Animals." By DR. HENRY E. CRAMPTON.

DARWIN MEMORIAL CELEBRATION.

HELD in coöperation with the New York Academy of Sciences.

Friday, February 12, 3:30 o'clock p. m.

Addresses will be delivered as follows:

Presentation to the Museum of a bronze bust of Darwin by CHARLES FINNEY COX, President of the Academy.

Acceptance on behalf of the Trustees of the Museum by HENRY FAIRFIELD OSBORN, President of the Museum.

"Darwin and Geology," by JOHN JAMES STEVENSON.

"Darwin and Botany," by NATHANIEL LORD BRITTON.

"Darwin and Zoölogy," by HERMON CAREY BUMPUS.

PEOPLE'S COURSE.

GIVEN in coöperation with the City Department of Education. Illustrated with stereopticon views.

Tuesday evenings at 8 o'clock.

February 2.—IAN C. HANNAH, "Japan's Transformation."

February 9.—IAN C. HANNAH, "America as an Asiatic Power."

February 16.—MRS. LUCIA AMES MEAD, "World Organization."

February 23.—ISYA JOSEPH, Ph.D., "Mohammed and Mohammedanism."
(Illustrated with costumes.)

Saturday evenings at 8 o'clock.

February 6.—H. A. SMITH, "National Forest Policy."

February 13.—OVERTON W. PRICE, "Conservation of Natural Resources."

February 20.—PROFESSOR H. E. GREGORY, "The Life History of a Lake."

February 27.—CYRUS C. ADAMS, "Earthquakes."

Children are admitted to these lectures only on presentation of Museum Members' tickets.

MEETINGS OF SOCIETIES.

Public meetings of the New York Academy of Sciences and its Affiliated Societies are held at the Museum according to the following schedule:

On Monday evenings, The New York Academy of Sciences:

First Mondays, Section of Geology and Mineralogy.

Second Mondays, Section of Biology.

Third Mondays, Section of Astronomy, Physics and Chemistry.

Fourth Mondays, Section of Anthropology and Psychology.

On Tuesday evenings, as announced:

The Linnæan Society of New York, The New York Entomological Society and the Torrey Botanical Club.

On Wednesday evenings, as announced:

The New York Mineralogical Club.

On Friday evenings, as announced:

The New York Microscopical Society.

The programmes of the meetings of the respective organizations are published in the weekly *Bulletin* of the New York Academy of Sciences and sent to the members of the several societies. Members of the Museum on making request of the Director will be provided with the *Bulletin* as issued.

The American Museum Journal

EDMUND OTIS HOVEY, *Editor.*

FRANK M. CHAPMAN,
LOUIS P. GRATACAP,
WILLIAM K. GREGORY, } *Advisory Board.*

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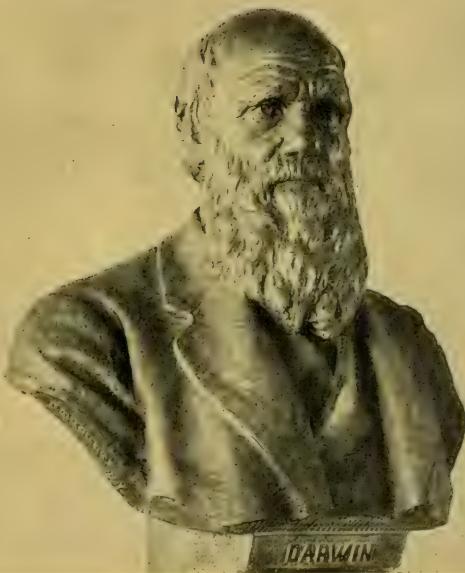
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THE AMERICAN MUSEUM
OF
NATURAL HISTORY

FOR THE PEOPLE
FOR EDUCATION
FOR SCIENCE

THE
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The membership fees are,

Annual Members.....	\$ 10	Fellows.....	\$ 500
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The Museum is open free to the public on every day in the year.



THE MEMORIAL BUST OF CHARLES DARWIN.

Presented by the New York Academy of Sciences, February 12, 1909.

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MARCH, 1909

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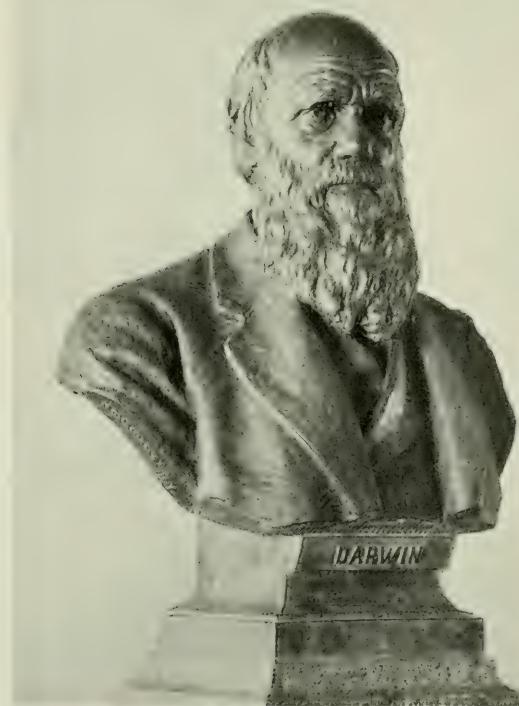
THE DARWIN CELEBRATION.

THE one hundredth anniversary of the birth of Charles Robert Darwin and the fiftieth anniversary of the publication of "The Origin of Species" were celebrated by the New York Academy of Sciences on February twelfth at the American Museum of Natural History. The occasion was made memorable by the unveiling of a bronze bust of Darwin, the Academy's gift to the Museum; also by the dedication of the Synoptic Hall of the Museum as "The Darwin Hall of Invertebrate Zoölogy," with the unveiling of bronze tablets thus inscribed at either side of the entrance from the Hall of Forestry. The bust was presented by the Academy's president, Charles Finney Cox, and was accepted on behalf of the trustees of the Museum by President Henry Fairfield Osborn.

The bust is pronounced by those who knew Darwin personally, and by his sons in England, who have seen photographs of the clay model, the best portrait in the round of the great naturalist ever made. It is the work of William Couper, sculptured from photographs taken when Darwin was fifty years old, at the time of the publication of "The Origin of Species." President Osborn's acceptance of the bust, as a valuable work of art and as an expression of appreciation by the New York Academy of both the technical and the directly educational work of the Museum, gives this impressive likeness of Darwin permanent place in the Darwin Hall of Invertebrate Zoölogy. Here it will stand to testify to Charles Darwin's method of scientific study, namely, a humble and direct approach to nature, in self-reliance and with independence of thinking. The speakers of the afternoon, representing Geology, Botany and Zoölogy, and each claiming Darwin as the inspiration to freedom of thought in the given science, were Professors John James Stevenson, Nathaniel Lord Britton and Hermon Carey Bumpus.

But a few years ago, even to consider the question of evolution was held to be irrational and immoral, not only by the world at large, but also by the intellectual world, with the exception of a small body of scientists.

The change has come since the appearance of "The Origin of Species" in 1859, and outside of the scientific centers at Philadelphia, Boston, Washington, New Haven and New York, it has seemed to come slowly; but the effect has been cumulative, and to-day thinkers in all lines accept the fact of evolution. In the first ten years after 1859, many of the older scientists ignored or fought the doctrine bitterly. Even Agassiz remained



FRONT VIEW OF DARWIN BUST.

on the side of the creation of each species as we find it. Asa Gray, however, who knew Darwin personally and who had published a review of "The Origin of Species" before a copy reached America, stood firmly not only for the theory of evolution, but also for that which Darwinism signifies, the theory of Natural Selection as the working process of evolution.

tion. He inspired the younger men in the Boston scientific center, Shaler, Verrill, Packard, Morse, Hyatt, Allen and Scudder, and through their influence enthusiasm for Darwinism grew until a climax was reached in 1876. Since that date every biological worker in the country has found his research an item to strengthen belief in evolution, and



PROFILE VIEW OF DARWIN BUST.

also, it is true, often to expose some weakness or mend some flaw in the doctrine of Natural Selection.

Darwin, however, did not consider his work faultless, final or complete. In his day the general theory of evolution was already well established in many scientists' minds, due to the work of anatomists such as Lamarck and Cuvier. Darwin marshalled the facts that the

world could then give, to formulate clearly and boldly a possible explanation of the method by which evolution had produced existing life forms. From the geometric increase in numbers due to the normal rate of reproduction of plants and animals, there resulted a struggle for existence, a three-fold struggle (1) with the environment, which not only brought the animal the ordinary exigencies of life, but also perhaps presented suddenly wholly new problems due to some geological change during the earth's history, (2) with members of the same species in search of homes and food and (3) with direct enemies. Since all forms vary at birth, some were less well fitted for the struggle than others; they died for lack of food or were killed by enemies; those better fitted survived. Thus the best fitted for life in a given region became the parents of the next generation, and, if the environmental conditions remained unchanged for many generations, heredity brought about a better adapted race, a "nature selected" race, and, what is the important and contested point, a new variety or species, that is, a race different from the ancestral one. Thus, according to Darwinism, new species come about through slow, minute and cumulative changes. One of the strongest pieces of work done since Darwin's time, that of Hugo de Vries, proves that species may come into existence abruptly also, by large changes or "mutations," de Vries holding that the mutation theory supplements Natural Selection but does not supplant it.

Whether, however, Darwinism lives in the future, or fails under the critical scrutiny of the army of working scientists and in the light of a vast aggregation of new facts, Darwin's position of eminence cannot be assailed. He stands for supreme service to mankind in that he forced into the world of organized knowledge love of truth and abhorrence of slavery to tradition. He was a great seer in a scientific world where practically all was new ground. He was a "naturalist," one of the few deserving the name, with masterly grasp of all known facts in the various branches of natural science. Since his time each of these branches, botany, zoölogy, geology, has grown until it seems that no one mind can comprehend the details of even one of them. The result is that to-day every man is working on his chosen problem, and often the field of that problem is extremely limited, though it involves weighty principles.

Will there come a second Darwin, again to grasp all nature in clear mental vision? His task would be the same as was Darwin's, though far more difficult because of the larger body of knowledge,—to accept

and organize all accumulated information, while at the same time holding his own opinions and formulating his own theories. The work of the new Darwin would marshall to the front or banish to oblivion the many tangled theories of the present, and all so clearly and convincingly that there would be forced upon him who reads a repetition of the effect of "The Origin of Species," the conviction that, after all, the task was an easy one, for there could be no other conclusion.

An important feature of the celebration is the special exhibition in the Hall of Forestry and the new Darwin Hall comprising carefully selected specimens and groups of specimens bearing upon the Darwinian theory of Evolution through Natural Selection; also a valuable collection of Darwiniana consisting of letters, writings and portraits of Charles Darwin, as well as a series of photographs of Darwin's contemporaries. The exhibition is open free to the public and will remain in place till March 12.

NEW HABITAT GROUPS OF NORTH AMERICAN BIRDS.

THE high degree of realism and artistic effect achieved in the installation of the Habitat Groups of North American Birds is unique in Museum exhibition. Begun in 1898 with the Bird Rock Group of the Gulf of St. Lawrence, and now nearing completion, the series has entailed a large amount of travel and study on the part of Mr. Frank M. Chapman, Curator of Ornithology, and invaluable assistance on the part of the Museum's taxidermists and artists.

Conceive the ingenuity and labor involved in imitating, accurately as to locality, flawlessly as to workmanship, the snow or water, rocks and vegetation of from sixty to one hundred sixty square feet of a given region; then so to blend the real foreground with a painted background that, quite as in nature, the eye passes from the flowers and birds near at hand, to meadows that stretch to the horizon or to mountains and sky.

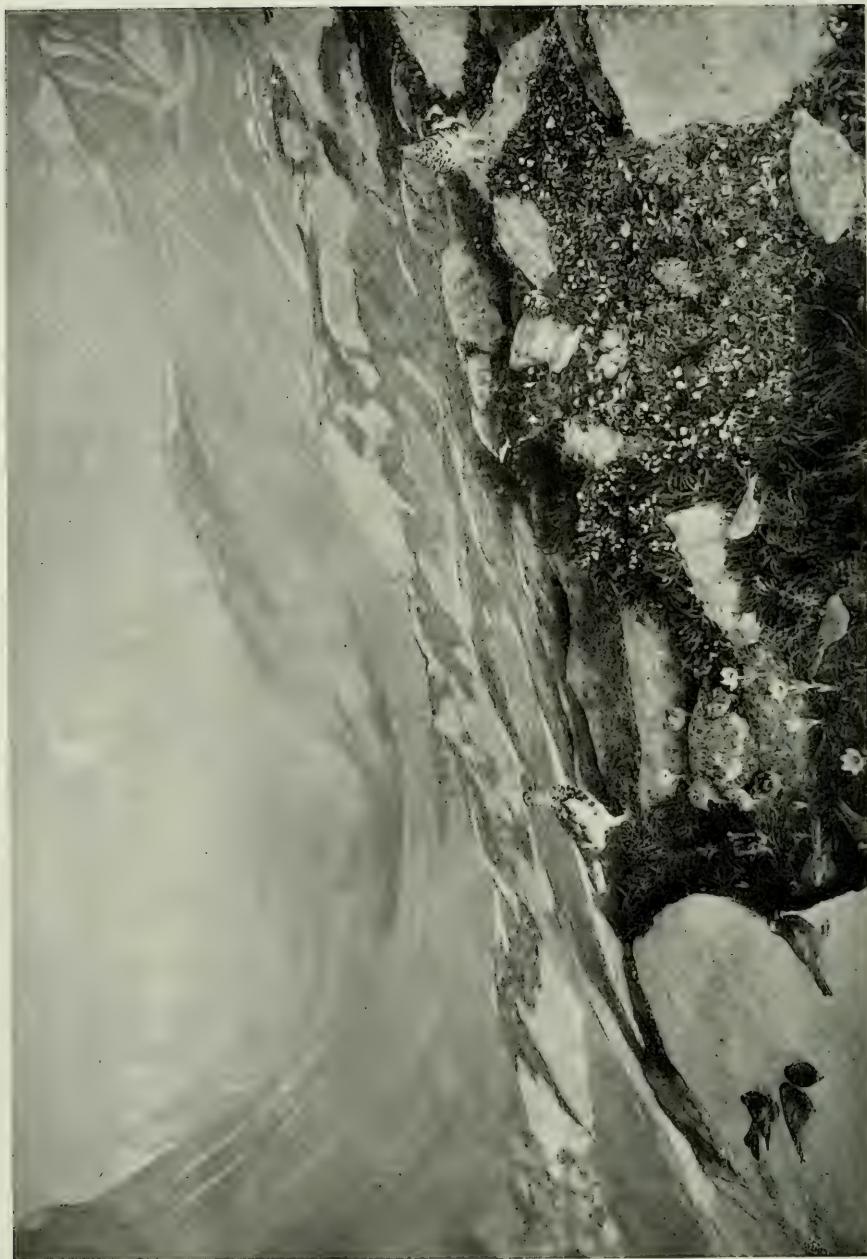
The east side of the Bird Group Hall has been previously opened to the public. The west side was opened formally to Members of the Museum on February 26 to mark the completion of six new groups, a demonstration of the method of construction being given by the Cuthbert Rookery Group, only partly finished at that time. On the following day the gallery was thrown open to the general public.





A KLAMATH LAKE BIRD COLONY.

Background by Carlos Hittell. Birds by Herbert Lang.



To view the scene of the first of these new groups we must make the long journey to the Bahamas and there search out Cay Verde. This is a small coral islet with no fresh water, and with the dark blue of great sea depths sharply separated from the light water of its shallow banks. The islet is of peculiar interest since it lies in the line of migration, and being the only landing place in a large expanse of water, receives calls from many migrating birds. Two species, the Booby and the Man o' War bird, nest there in large numbers in March, the Boobies on the ground, the Man o' War birds in the sea grape and prickly pear cactus of the islet. Boobies are particularly tame when on the nests. This is due in part to the fact that they have had no opportunity to learn fear of man, but in addition it probably results from the strength of their parental instinct, which so controls their fear that they do not leave their nests when an intruder walks among them and makes intimate acquaintance with family after family.

The male Man o' War bird is ornamented with a large throat-pouch of vivid red, which, inflated like a toy balloon, makes the bird conspicuous whatever its environment. This ornamentation, actually disadvantageous in the struggle for existence, furnishes an illustration for Darwin's Sexual Selection theory. To-day, all recognize the matter of ornamentation among animals as one of the most difficult of biological problems, whether tentatively accounting for it on this theory of the female's choice of the most attractive, or as a direct physiological and structural result of the male's excessive energy, or by yet other theories.

If we move to the second of the new groups, we are transported thousands of miles across the continent and north to the California-Oregon boundary line, where the shallow water of Klamath Lake contains many islands of rushes and is surrounded by treeless hills with Mt. Shasta in the distance. It is a picturesque place, but much of the region will be drained by a government reclamation project and converted into orchards and fields of alfalfa. The Klamath Lake group shows Cormorants and Gulls, also Caspian Terns; but interest centers in the White Pelicans, immense birds with wing expanse of from eight to nine feet. There are interesting studies of flying Pelicans, and in the foreground one young bird is illustrating its amusing method of fishing down its parent's throat. One adult shows the bill-knob of the nuptial season. It will be a matter of regret if the demands of civilization push this bird to extinction. Unlike many birds, to which advance in civilization

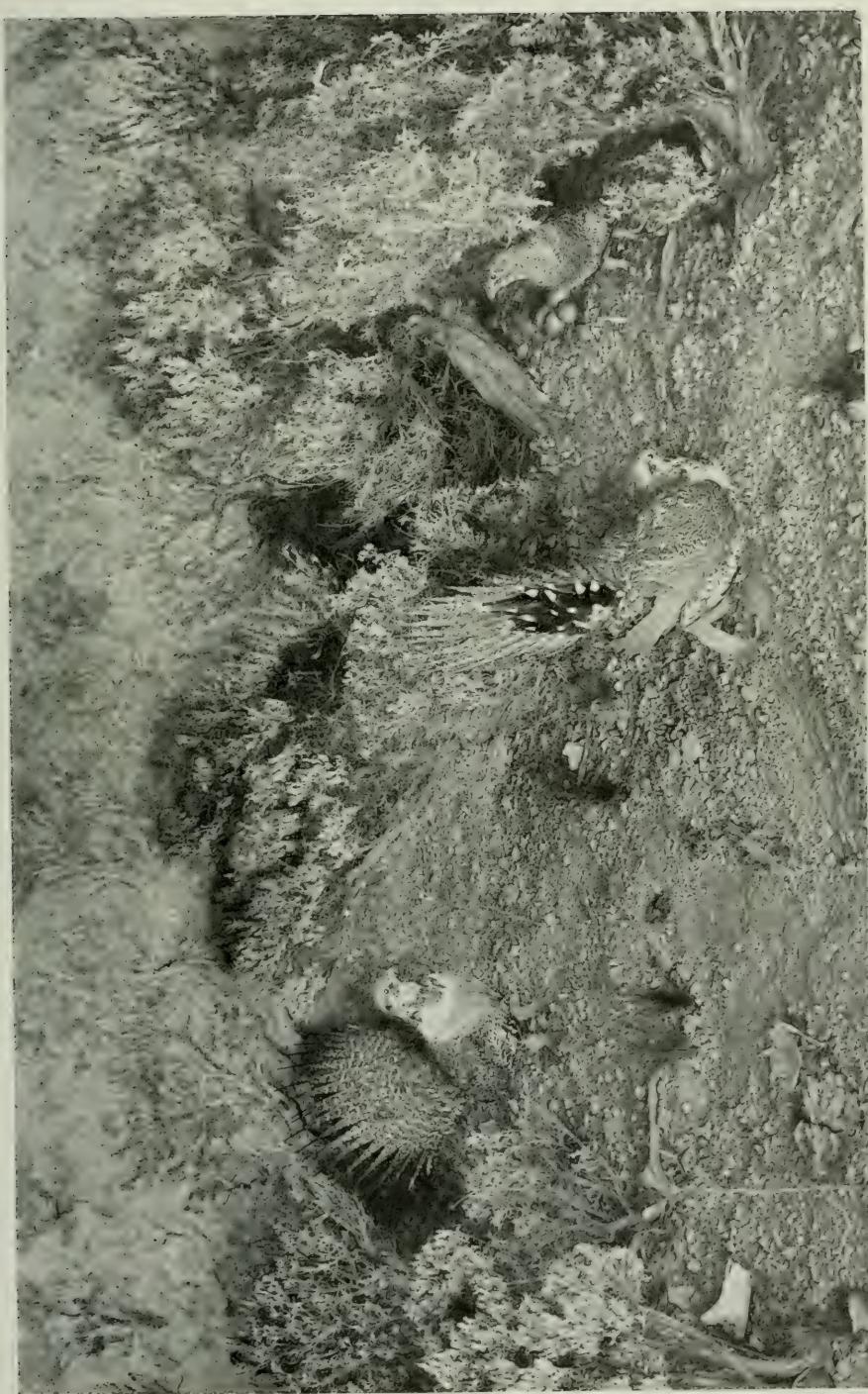
means merely more food and fewer enemies, the Pelican is too specialized for survival; it can adapt itself only to insular life and an abundance of fish. It must be saved through the creation of government reservations for the purpose. An important step toward the protection of western water-fowl was taken by President Roosevelt in August, 1908, when he set aside the Lower Klamath Lake and Lake Malheur Reservations.

The third group carries us to the Canadian Rockies at Ptarmigan Lakes. In the foreground are White-tailed Ptarmigans in mixed white and brown plumage, for it is the height of the Alpine Spring (July 15) and the birds' white plumage of Winter is giving place to the summer coat. A nest of five spotted eggs is set among gray rocks and lichens, only a few feet from the border of an unmelted snowfield, yet surrounded by the star-like flowers of *Dryas*, by heather in bloom and by anemones two inches across. One Ptarmigan is shown with six downy chicks in spirited attitudes. The apparent fragility but real endurance of this life is enhanced by what is to be seen on lifting the eyes from the ground, a circle of austere snow-covered mountain peaks and, far below, the ice and blue water of an opening lake.

The Ptarmigan is a boreal type. It is found as far south as New Mexico, but only at high altitudes, the species possibly having survived in these Arctic-Alpine regions when left stranded there by the retreating ice of the Glacial Period. Ptarmigans not only present one of the most striking cases of coloration like the environment of the season, nor only an instance of gradation of color from above downward to counteract the shadow gradation from below upward and produce the effect of unsubstantiality, but they also have correlated with this color protection, the instinct to remain motionless in the face of the enemy.

The fourth group, showing the Sage Grouse, keeps us in the West, descending from Alpine regions to the high sage-brush plains of Wyoming. The Sage Grouse is the largest of North American game birds with the exception of the Wild Turkey. The group illustrates some of the remarkable performances of the birds at the mating season.

The remaining two groups, representing the Western Grebe and the Wild Goose, show the rolling treeless plains of Western Canada, at Crane Lake, Saskatchewan. The Grebe group illustrates instincts such as always prove a lure afield to the bird student. One parent bird is swimming in stately fashion, while, peeping from the warm cradle between her back and wings, four eager and contented young birds are



SAGE GROUSE IN WYOMING.
Background by Carlos Hittell. Birds by Herbert Lang.



GREBES (UPPER FIGURE) AND WILD GOOSE (LOWER FIGURE) ON CRANE LAKE,
SASKATCHEWAN.

Backgrounds by Hobart Nichols. Birds by Herbert Lang.

taking a sail with her; another parent bird is covering her nest of eggs preparatory to leaving it; everywhere the birds swim with their long necks erect so that the perpendicular lines of black and white resemble the surrounding reeds and reflections. The Western Grebe is slaughtered mercilessly by plume hunters, the birds' snow-white breasts appearing in market in capes and muffs and on hats.

The Museum acknowledges its large indebtedness for this series of Bird Habitat Groups to the generosity of several of its members, but particularly to the following: Mr. John L. Cadwalader and to Mrs. Morris K. Jesup, Mrs. Philip Schuyler, Mrs. John B. Trevor, Mrs. Robert Winthrop, Mr. F. Augustus Schermerhorn, Mr. H. B. Hollins, Mr. Henry Clay Pierce, Mr. Henry W. Poor, Mr. Charles Lanier and Mr. Courtenay Brandreth.

THE ANNUAL MEETING OF THE TRUSTEES.

AT the Annual Meeting of the Board of Trustees of the Museum, held on Monday, February 8, the following officers were elected for the ensuing year: HENRY FAIRFIELD OSBORN, President; J. PIERPONT MORGAN, First Vice-President; CLEVELAND H. DODGE, Second Vice-President; J. HAMPDEN ROBB, Secretary, and CHARLES LANIER, Treasurer. The following abstract of the president's annual report will be of interest to the Members.

In point of growth the past year has been the most notable in the history of the institution. Partly aided by the Jesup bequest, the total expenditures were \$275,419, or \$25,000 more than the previous year. Of this the city contributed \$159,930.62 and the Museum \$115,488.38. In the past eight years the Museum has expended directly \$932,008 on its explorations and collections. The estimated total value of the collections secured during this period by exploration, by purchase and by gift to the Museum is more than \$2,000,000. For every dollar which has been expended by the city, more than a dollar has been added to the enlargement of the collections.

The present endowment fund, including the bequest of the late President Jesup, is \$2,048,156.61. To keep pace with the very rapid growth of the city and the demands it is making for public scientific education, an endowment fund of \$5,000,000 is needed. In every

part of the world the advance of agriculture and commerce and the spread of fire arms is rendering more scarce the objects of natural history of all kinds, including the works of the primitive races of men. It is deemed vitally important to push the explorations of the Museum in all parts of the world, while it is still possible to secure these fast vanishing works of nature and of primitive man. During the year 1908 and at the present time the Museum's explorations extend to the Mackenzie River and the shores of Beaufort Sea, to Alaska, Vancouver, Alberta and Saskatchewan, the west coast of Hudson Bay and western Labrador; in the United States parties have been spread in Wyoming, Montana, Idaho, North Dakota, Nebraska, Colorado and Florida, also in Central America, and in the south to Nicaragua, the West Indies and Bahama Islands; in Asia special agents are working in Kashmir, China and Corea; among the islands of the Pacific the Museum is working in the Philippines, the Solomon Islands, Tahiti, New Zealand, the South Shetland Islands and Kerguelen Island.

Popular education has been given a stronger impulse than ever before. The Museum was open free to the public every day of the year and on 179 evenings. The gross attendance last year was 1,043,562, in large part due to the exceptional interest in the International Tuberculosis Exhibition. The attendance at public afternoon and evening lectures reached a total of 82,718. The number of children visiting the Museum in lecture classes was 10,325. The number of children who were especially guided through the Tuberculosis Exhibition and who listened to lectures on simple means of prevention of this disease was 41,627. These children came from all the high schools of Greater New York and from many distant towns and cities. In the schools of the city 575,801 children were reached by the system of the circulating nature study collections.

During the coming year the principal new exhibitions which will be developed are, in particular, the Children's Museum, the Museum for the Blind, the Philippine Exhibition and the Congo Exhibition presented by King Leopold of Belgium. The last is the most complete collection outside of that which is to be seen in the Congo Museum near Brussels. As a result of the Tuberculosis Exhibition immediate steps will be taken to make a special exhibition of the life and habits of the smaller organisms in relation to health and disease.

THE STEFÁNSSON-ANDERSON ARCTIC EXPEDITION.

LATE in February, a welcome letter was received from Mr. Vihlalmi Stefánsson, who, together with Dr. R. M. Anderson, was sent by the Museum last summer to make ethnological, geographical and biological studies along the arctic coast of North America in the vicinity of the mouth of the Mackenzie River. Mr. Stefánsson writes as follows:

“CAPE HALKETT, ALASKA, Sept. 25th, 1908.

“On my way east along the coast I have just come upon Capt. William Mogg’s vessel, the “Olga,” frozen in the ice off shore at Halkett. [Long. 152° W.] The captain will abandon his ship next Tuesday. * * * * *

“I have not my diary with me — it is at our camp on shore and I am at Capt. Mogg’s ship three miles off shore in the ice — so I cannot give exact dates, but we left Point Barrow about August 29th or 30th. We had head winds and foggy weather and finally froze in [at] Smith Bay September 6th — very bad luck; some years boating is good till October 1st or after. We could do nothing but prepare safe caches on shore for our stuff until the ice was strong enough for sled travel September 18th, when we started east. We soon came to weaker ice, however, and had to delay and go slowly, so we are only this far by now, but hope for better traveling.

“Dr. Anderson I suppose to be safe either at Barter Island or inland from there, looking for deer and mountain sheep. I hope we shall be down to him in some 10 days from now. All we shall bring, however, is tobacco and matches, for we had only four dogs with us, and succeeded in making only an indifferent sled out of driftwood. If we fail in hunting and fishing to the eastward we shall probably — some of us at least — retreat upon our cache in Smith’s Bay and be able to turn a penny trapping while we eat up the flour, etc.— for it is an excellent fox country, though there are no people, because there are no food animals.

“I expect I shall get to Herschel Island in time to write you by the police mail, and you should get the letter about as soon as this one, while I should be able to give in it more information as to ourselves. Seeing, however, that one of our whaleboats is frozen in so far west, I hope, among other things, that we can get together a good collection — perhaps several hundred skulls — of bones from the ancient graveyards along the sandspit between Point Tangent and Point Barrow. I saw over a hundred (on top the ground) in a walk through one of them when we were ashore in a calm coming east. We shall also almost certainly be able to do some good digging on the island just

east of the Colville Mouth from which I last year got a few specimens for the Peabody Museum, * * * * * As to getting to Prince Albert Land or Coronation Gulf, I think there is no reasonable doubt of it for next year — “barring accidents” and such unparalleled hard luck as everybody has had up here this year.

“Near Point Tangent a trading schooner passed us going east and I got them to take 27 sacks of flour and some other stuff for Dr. Anderson, but Capt. Mogg tells me she probably did not get within some 60 miles of Barter Island — certainly not farther than Flaxman and probably not so far. That will be well enough for us, for the nearer the Colville the better.

“I met the other day an Eskimo who used to live in the Colville. From him I got a map which should enable me to locate at least three families of the Colville group this winter — so the Colville plans are all right, so far, except their expensiveness, as previously confessed from Point Barrow. * * * * ”

RECENT PURCHASES OF FOSSIL VERTEBRATES.

THE Department of Vertebrate Palaeontology has recently purchased from Mr. Charles H. Sternberg, the well known collector, a number of important fossils. Chief of these is a unique specimen — a “mummied” Dinosaur, as President Osborn has aptly called it. It is a nearly complete skeleton of the Trachodon or Duck-billed Dinosaur, in which not only the bones but also the greater part of the skin of the head, body and limbs is preserved intact. As found in a soft sandstone stratum near Lance Creek, Wyoming, the skeleton lay on its back, the head turned to one side, the fore limbs stretched out, the hind limbs doubled up close to the body. Over head, neck and limbs lies the thin curtain of skin, shrunk down tight upon the bones and sunken in over most of the body cavity below the ribs.

At first glance, the skin seems to have irregular rows of small spots over the surface, the spots being about the size of a half dollar or less. On closer examination, each spot is seen to be made up of a number of little polygonal plates, like the pieces of a mosaic, with innumerable smaller plates filling the interspaces between the spots. There are no overlapping scales such as cover most modern reptiles, nor anything like the smooth or hairy skin of mammals or the feathered skin of birds. The dinosaur skin is *sui generis*, — completely unlike that of any modern

animal. A part of the tail of the same species, now on exhibition in the Dinosaur Hall, shows a considerable area of skin, much like that of this skeleton, but with larger plates and no distinct pattern of spots. Traces of the skin are preserved in several other kinds of extinct reptiles, but nothing has been found that compares with this in its perfect preservation.

To all appearances, the animal must have died on some dry, sandy spot exposed to the sun, so that the carcass dried and shrank to a natural mummy. Then it must have been suddenly buried by a flood of sand from a freshet, so rapidly and deeply that the skin had no chance to soften and decay, but was preserved and petrified with the bones. This occurred three million years ago, on a moderate estimate of geologic time. We think of the mummies of Egypt, three or four thousand years old, as being of respectable antiquity. Still more venerable are the mammoths which have been found buried in the frozen tundras of Siberia and Alaska, and their outward appearance thus preserved to our day. But even the mammoths, tens of thousands of years old though they be, are mere creatures of yesterday, modern upstarts, compared with the hoary antiquity of this dinosaur mummy.

It will be a matter of several months' work to complete the preparation of this specimen for public exhibition, but, when finished, it will do more than any mere skeleton or pictured restoration to impress upon us the reality of the ancient world of the Dinosaurs.

Two other specimens purchased from Mr. Sternberg are marine reptiles from the Kansas chalk beds, a little older than the formation in which the *Trachodon* was found. One is a skeleton of the marine turtle *Toxochelys*, the other a fine skull of the Mosasaurian or swimming lizard *Clidastes*. There are also two specimens of comparatively recent geological age, one a fine skull of the extinct long-horned bison, six feet from tip to tip of the horns, and a lower jaw of the Imperial Mammoth,—both from the Pleistocene of Kansas. Two huge tortoises from the Miocene beds of Kansas and the skull of a small rodent related to the beaver, but of burrowing habit, are likewise included in the collection.

Mr. Sternberg is a genuine enthusiast in searching for these memorials of the former history of the world we live in, and it is a satisfaction no less to himself than to the American Museum to see these fine specimens placed where they will be seen and appreciated by thousands of visitors each year. He has already contributed to our collection some notable specimens and many fossils of much scientific interest. M.

MUSEUM NEWS NOTES.

THE following members have been elected since the last issue of the Journal: Patron, Mr. W. K. VANDERBILT; Life Members, MESSRS. NORMAN B. REAM, JOHN S. KENNEDY, ALEXANDER WALKER and JOHN J. WILLIAMS and MRS. E. A. SLAVEN; Annual Members, MESSRS. FITZ ROY CARRINGTON, EDWIN PARSONS, PERCY R. PYNE, 2d, RICHARD SUTRO, D. S. RAMSAY, F. S. SMITHERS, ALFRED G. VANDERBILT, GEORGE HAMILTON DEAN, WILLIAM T. HILLES, CHARLES E. SEITZ, A. H. WRAY, ADOLPH RIESENBERG, L. WILLIAM HORN, JAMES I. BARR, WILLIAM B. HORNBLOWER and CHARLES E. PARSONS, DOCTORS HERMANN M. BIGGS and EDGAR S. BARNEY, HON. HUGH J. GRANT and MMES. C. C. AUCHINCLOSS, THOMAS KIRKPATRICK, HELEN C. ROBBINS and J. A. VANDERPOEL.

THE Museum is preparing a Philippine Exhibit for the United States War Department. It is intended to cover the ethnology of the Islands and also to give especial attention to Philippine agricultural and industrial conditions since 1898, the date of American occupation. The exhibit will be set up at the Museum and then forwarded to Seattle, where it is to be displayed at the Alaska-Yukon-Pacific Exposition.

PROFESSOR AARON L. TREADWELL, of Vassar College, has been appointed Honorary Curator of Annulates.

SCIENTIFIC PUBLICATIONS IN 1908.

THE scientific publications of the Museum in 1908 comprised Volume XXIV and Volume XXV, Part I, of the BULLETIN, Volume X, Part II, and Volume XIV, Part II, of the MEMOIRS and Volume I, Parts IV, V and VI and Volume II, Part I of the new series of ANTHROPOLOGICAL PAPERS.

The articles contained in these various publications are technical in character, but many of them have general as well as scientific interest, and their titles are given in the following list. They indicate in part, the scope of the activity of the Museum staff in research in several departments of natural science. The articles are published separately and, like the complete volume, may be obtained from the librarian except as indicated.

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LECTURE ANNOUNCEMENTS.

MEMBER'S COURSE.

THURSDAY evenings at 8:15 o'clock. Doors open at 7:45 p. m.

The second course of illustrated lectures for the season 1908—1909 to Members of the Museum and persons holding complimentary tickets given them by Members will be given in March and April according to the following programme:

March 4.—“Birds in Their Relation to Man.” By MR. FRANK M. CHAPMAN, Curator of Ornithology in the American Museum of Natural History.

What the Bird does for the State. The bird and the forester; the bird and the fruit-grower; the bird and the farmer; the bird and the citizen; the bird and the nature-lover.

What the State does for the Bird. Bird destruction for pleasure and for profit; influence of increasing population on bird-life.

What the State should do for the Bird. Bird conservation by law and by creating favorable environmental conditions.

March 11.—“The Conservation of Our Rivers and Lakes.” By MR. CHARLES H. TOWNSEND, Director of the New York Aquarium.

Mr. Townsend will speak on the importance of our fresh waters for fisheries, town water supply, water power, irrigation, navigation and recreation; the dangers which threaten them on account of pollution and deforestation; the remedies which may be applied through sewage disposal, fish culture, impounding of waters, protection of the watersheds and the development of navigable waterways.

March 18.—“The Conservation of Natural Scenery in America.” By MR. J. HORACE MCFARLAND, President of the American Civic Association for a Better and More Beautiful America.

The address will deal with the value of natural scenery in its effect on the human mind, and with the danger of inconsiderately destroying natural beauty in that

change of scenery which comes about from exploitation of our American resources. Mr. McFarland will speak of the Grand Canyon of Arizona, of the Yosemite National Park, of the Falls of Niagara, of the Panama Canal, and of other development and conservation in which we have paid no attention to the beauty of our natural scenery.

March 25.—“Conservation from the Palisades to the Adirondacks.” By

MR. EDWARD HAGAMAN HALL, Secretary of the American
Scenic and Historic Preservation Society.

According to the old style of reckoning, March 25, 1909, will be the 300th Anniversary of the departure of Henry Hudson from Amsterdam on the voyage which brought him to the Hudson River. This fact gives especial propriety to the subject of conservation of the natural resources and landscape beauties of the famous river which rises in the Adirondacks and flows past the Palisades to the sea.

April 1.—“The Passing of Our Great Wild Animals and Means taken to

Restore Them.” By DR. WILLIAM T. HORNADAY, Director
of the New York Zoölogical Park.

Dr. Hornaday is in touch with the majority of the game regions of the world, and for thirty years has carefully watched the decrease of wild life. He will point out that everywhere the larger mammals are being killed much more rapidly than they breed, and that to-day the only hope for the preservation of many important species is absolute protection in game preserves. A few illustrations will be shown of an ideal game preserve very recently created in British Columbia for the sheep, goat, elk, mule-deer and grizzly bear.

PUPILS' COURSE.

THESE illustrated lectures are open to the pupils of the public schools when accompanied by their teachers and to the children of Members of the Museum on the presentation of Membership tickets.

Lectures begin at 4 p. m.

Mch. Mch.

Monday, 8 29.—“New York City in Colonial Days.” By R. W.
MINER.

Wednesday, 10 31.—“Japan and Her People.” By LOUIS HUSSAKOF.
Apr.

Friday, 12 16.—“The Panama Canal.” By E. O. HOVEY.

Monday, 15 19.—“Famous Rivers of the World.” By WALTER
GRANGER.

Wednesday, 17 21.—“Natural Wonders of Our Country.” By R. W.
MINER.

Friday, 19 23.—“American Forests and their Uses.” By G. H.
SHERWOOD.

Monday, 22 26.—“Mediterranean Countries, Ancient and Modern.”
“By WALTER GRANGER.

Wednesday, 24 28.—“The American Indian of To-day.” By H. L. SMITH.

Friday, 26 30.—“Travels in the Western States.” By BARNUM BROWN.

LECTURES ON BIOLOGY.

ARRANGED by the Biology Departments of the Normal College and the High Schools of Manhattan. Illustrated with stereopticon views.

Thursday afternoons at 3:30 o'clock.

Two lectures remain to be given.

March 18.—“Public Health.” By DR. THOMAS M. DARLINGTON.

April 15.—“Natural History of Animals.” By DR. HENRY E. CRAMPTON.

PEOPLE'S COURSE.

GIVEN in coöperation with the City Department of Education.

Tuesday evenings at 8 o'clock. Doors open at 7:30.

Three lectures by PROFESSOR A. D. F. HAMLIN of Columbia University on “The Architecture of Great Cities.” Illustrated with stereopticon views.

March 2.—“Rome.”

March 9.—“Constantinople.”

March 16.—“Venice.”

March 23.—“History of Architecture as seen in New York Buildings.”
By MR. JOSEPH M. TILDEN.

Three lectures by PROFESSOR A. D. F. HAMLIN on “The Architecture of Great Cities.” Illustrated with stereopticon views.

March 30.—“Paris.”

April 6.—“London.”

April 13.—“New York.”

April 20.—“Florence.” By MR. FRANCIS M. STRICKLAND.

April 27.—“Berlin.” By MR. HENRY ZICK.

Saturday evenings at 8 o'clock. Doors open at 7:30.

March 6, 13, 20 and 27.—A course of four lectures by MR. O. F. LEWIS on “Modern Methods of Charitable Help.”

April 3.—“Child Labor.” By MR. OWEN LOVEJOY.

April 10.—“The Children's Court.” By MR. E. K. COULTER.

April 17.—Subject and lecturer to be announced.

April 24.—“The City Beautiful.” By MR. A. A. STOUGHTON.

Children are not admitted to the lectures of the People's Course, except on presentation of a Museum Member's Card.

MEETINGS OF SOCIETIES.

Public meetings of the New York Academy of Sciences and its Affiliated Societies are held at the Museum according to the following schedule:

On Monday evenings, The New York Academy of Sciences:

First Mondays, Section of Geology and Mineralogy.

Second Mondays, Section of Biology.

Third Mondays, Section of Astronomy, Physics and Chemistry.

Fourth Mondays, Section of Anthropology and Psychology.

On Tuesday evenings, as announced:

The Linnæan Society of New York, The New York Entomological Society and the Torrey Botanical Club.

On Wednesday evenings, as announced:

The New York Mineralogical Club.

On Friday evenings, as announced:

The New York Microscopical Society.

The programmes of the meetings of the respective organizations are published in the weekly *Bulletin* of the New York Academy of Sciences and sent to the members of the several societies. Members of the Museum on making request of the Director will be provided with the *Bulletin* as issued.

The American Museum Journal

EDMUND OTIS HOVEY, *Editor.*

FRANK M. CHAPMAN,
LOUIS P. GRATACAP,
WILLIAM K. GREGORY, } *Advisory Board.*

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- No. 2.—THE SAGINAW VALLEY COLLECTION. By H. I. SMITH, Assistant Curator of Archaeology. December, 1901. 10 cents.
- No. 3.—THE HALL OF FOSSIL VERTEBRATES. By W. D. MATTHEW, Ph. D., Assistant Curator of Vertebrate Palaeontology. January, 1902. *Out of print.*
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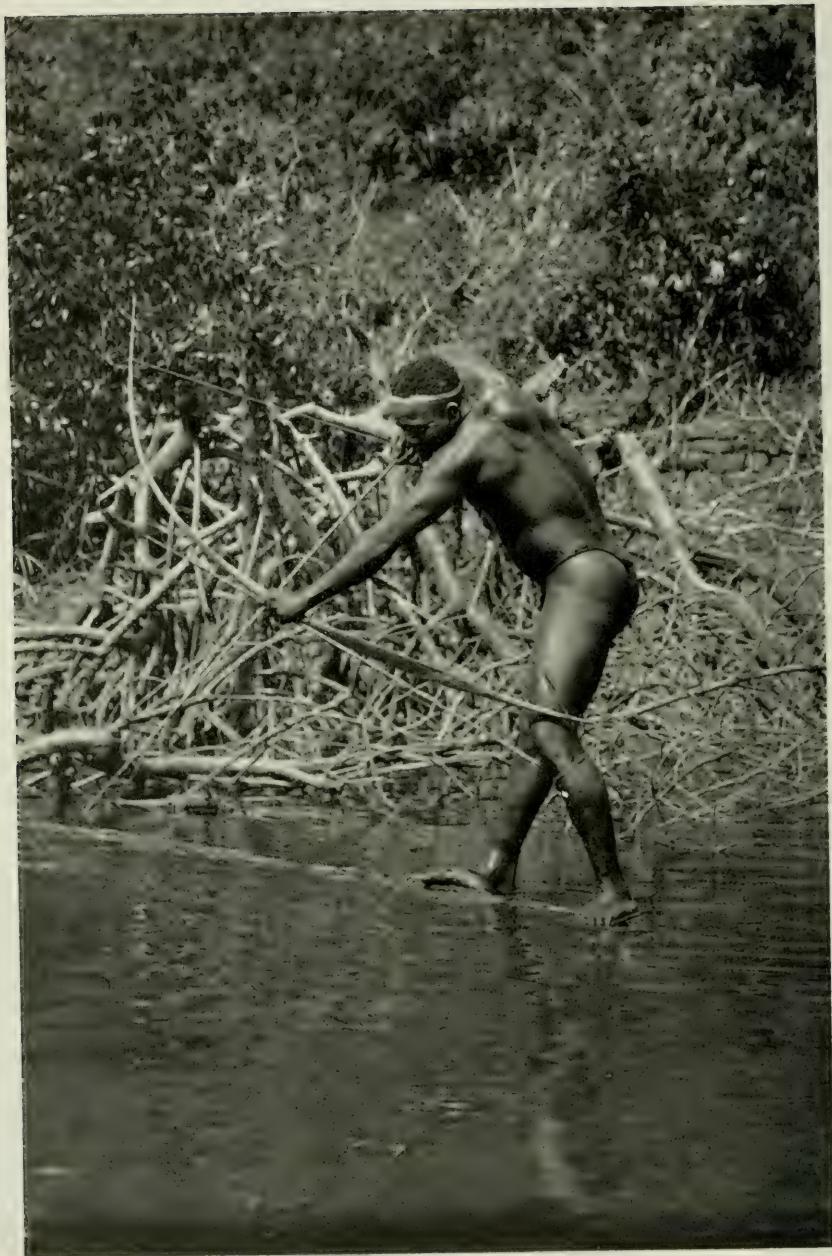
THE AMERICAN MUSEUM OF NATURAL HISTORY was established in 1869 to promote the Natural Sciences and to diffuse a general knowledge of them among the people, and it is in cordial coöperation with all similar institutions throughout the world. The Museum authorities are dependent upon private subscriptions and the dues from members for procuring needed additions to the collections and for carrying on explorations in America and other parts of the world.

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Annual Members.....	\$ 10	Fellows.....	\$ 500
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All money received from membership fees is used for increasing the collections and for developing the educational work of the Museum.

The Museum is open free to the public on every day in the year.



ANDAMAN ISLANDER SHOOTING FISH.

The American Museum Journal

VOL. IX

APRIL, 1909

No. 4

A COLLECTION FROM THE ANDAMAN ISLANDS.

THE Museum has lately acquired a considerable ethnological collection from the Andaman Islands which is of more than common interest. These islands, which until a comparatively recent date were almost a *terra incognita*, are still practically unknown to the general reader for the reason that the greater part of the literature that has appeared concerning them has been in the form of papers published by scientific societies, and has not been easily accessible to the public. For this reason a few words about the islands and their inhabitants may not be out of place before entering on a description of the more notable objects in the collection.

The Andamans form a narrow chain of islands, nowhere exceeding twenty miles in width, extending nearly north and south in the Bay of Bengal. The three main islands of the group, North, Middle and South Andaman, together with some small islands, are known as Great Andaman. To the south of these lies Little Andaman. The British established a penal settlement on South Andaman in 1789, but three years later removed it to North Andaman. In February, 1796, this colony was abandoned and the prisoners removed to Penang, while the free settlers and the troops were conveyed back to Bengal. From this date the Andamans remained unoccupied by aliens for sixty-two years. The British again formed a penal settlement on South Andaman in 1858, which has since been maintained for East Indian criminals.

The Andamanese belong to the Negrito race. They are small but well formed people with short frizzled hair, and with skin ranging in color from dark copper to sooty black. The following table, prepared by Mr. E. H. Man, gives a clearer idea of the stature and weight of these people than could be gained by any lengthy description.

Maximum	height of males	measured,	5 ft.,	4½ in.
"	"	" females	4 "	11½ "
Minimum	"	" males	4 "	5¾ "
"	"	" females	4 "	4 "

Mr. Man's results give as the average height of the men 4 feet, $10\frac{3}{4}$ inches, and of the women 4 feet, $7\frac{1}{4}$ inches, while their average weight is $98\frac{1}{8}$ pounds and $93\frac{1}{4}$ pounds, respectively.

It would probably be impossible, as Mr. C. Boden Kloss remarks, to find a people of purer descent, because ever since they peopled the islands in the Stone Age they have remained secluded from the outer world. To this isolation, furthermore, is due the uniformity so marked in their physical and mental characteristics.

Many were the fabulous stories told of these islanders in early times. Ptolemy is supposed to have referred to the Andamanese when he describes a people as "anthropophagi whose heads grew beneath their shoulders." It was also said that they had tails like horses. As regards the charge of cannibalism, not a particle of evidence has been discovered of such a practice among the Andamanese, even in remote times. The belief that their heads grew from below their shoulders and that they had tails like horses, may be traced to their custom of wearing the skulls of departed relatives suspended by a strap about the neck, and a tail-like bunch of pandanus leaves attached to their belts behind.

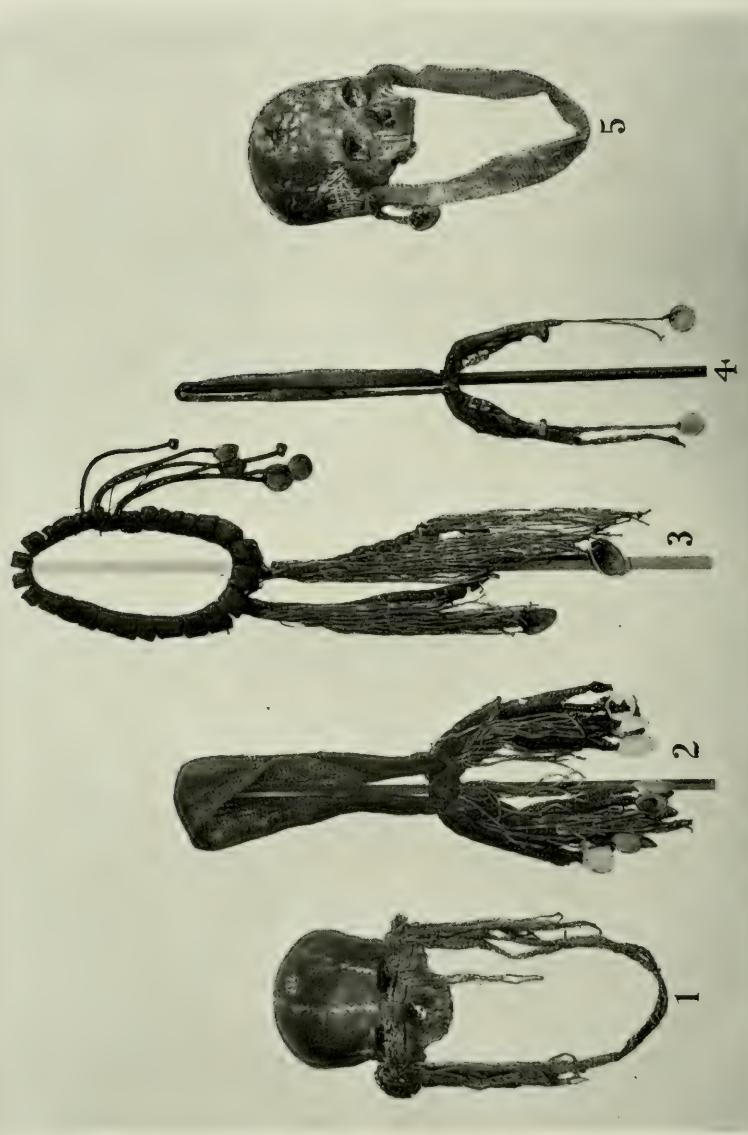
Clothes, as we understand the word, were unknown among the early Andamanese. Circlets about the neck, arms and legs and a waistband with a pendant bunch of leaves, shells, beads or other objects were generally worn, but even these were dispensed with in some localities. Some time after the establishment of the penal settlement at Port Blair, the aborigines in the vicinity were required, by law, to wear a sort of frock, but the idea in the minds of the islanders, concerning the purpose of this regulation is well illustrated by an amusing incident related by Dr. G. E. Dobson, who visited the Andamans in 1872 for the purpose of collecting zoölogical specimens. He says, "We were received by the wife of the chief, who had hastily donned the frock provided by the Government to receive visitors in, but very soon afterwards perceiving that no ladies were in our boat, she got rid of that unnecessary encumbrance, and presented herself in nature's garb, adorned by a single leaf, a garter tied below one knee, and a necklace composed of the finger and toe-bones of her ancestors." Tattooing is very generally practiced throughout the islands. The instrument formerly in use for incising the designs was a flake of quartz, but since the advent of the whites, a piece of glass has become the favorite tool.



THE MEETING (RIGHT) AND THE PARTING (LEFT) OF THE ANDAMANESE.



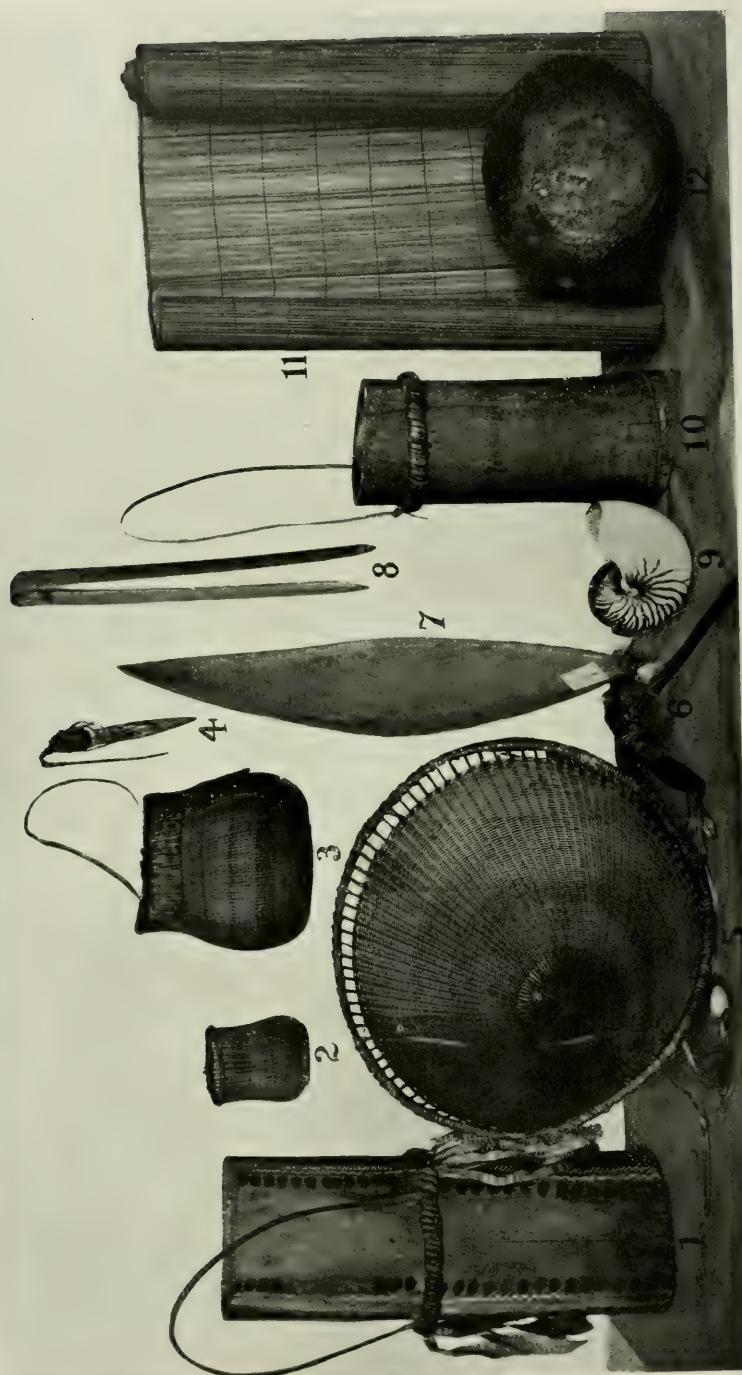
AN ANDAMANESE MARRIAGE CEREMONY.



PREPARED SKULLS AND BONES WORN AS TOKENS OF RESPECT FOR THE DEAD.



ANDAMANESE ORNAMENTS AND IMPLEMENTS.



BASKETS, MATS AND HOUSEHOLD IMPLEMENTS.

Since the establishment of the penal settlement at Port Blair, on South Andaman, the race, as is shown by government statistics, has been rapidly approaching extinction.

Description of Illustrations and Specimens.

The illustration on page 80 shows a man shooting fish, a pursuit in which the natives are very expert. As he stands in the edge of the water with drawn bow, every line of his supple body is full of grace. Note the peculiar shape of the bow in his hand, which is generally made of a kind of wood known in the islands as "Chai" (*Alphonsea ventricosa*). The arrows used for shooting fish are made of a reed-like variety of bamboo (*Bambusa nana*) and have a very short foreshaft of wood, to which is bound an iron point and one or more barbs of iron.

In the upper figure on page 83 are illustrated the customs in vogue at meeting and parting. Unlike most peoples, the Andamanese testify their joy at meeting by excessive weeping. When relatives meet after an absence of a few weeks, they sit together with their arms around each other's necks and indulge in loud wailings until nearly exhausted. At parting, the guest takes the hand of his host and blows on it. The compliment being returned, the guest takes his leave, shouting out invitations and promises of future meetings until out of earshot.

The marriage ceremony is shown in the lower figure of page 83. This consists in the chief of the tribe leading the bashful groom up to the equally bashful bride, and seating him in her lap, the prospective wife being in the meantime held in position by the women of the tribe. The chief then gives the young couple some advice as to their future conduct, and the ceremony is ended.

The illustration on page 84 shows objects connected with some of the most curious customs of the Andamanese. Figs. 1 and 5 show prepared human skulls, already referred to, which are worn as a token of respect for lost members of the family. These are carefully cleaned and painted; after which pendants with shells or fringe are attached, and a strap is put on by which they are suspended around the neck of the wearer. There is no obligation to wear this sign of mourning for any great length of time, and it is passed from one to another of the relatives. Figs. 2 and 4 are human jaws which are prepared and worn in the same way and for the same purpose as the skulls just described. Fig. 3 shows a band of human bones with pendant fringe and shells. This is a fetish, and is worn by friends of a sick person, as a cure. When a person is suffering pain, the fetish is frequently placed over the affected part.

Several objects, mostly ornaments, are grouped in the illustration forming page 85. Fig. 1 is a palm leaf, used as a sleeping mat, and as a protection from sun and rain. Figs. 2 and 3 are waist-bands. Fig. 4 is a fringe of cane leaves, attached to a stick. This is suspended from trees where death has occurred. Fig. 5 is a sling for carrying infants. Figs. 6, 7, 8, 9 and 12 represent bands with bones, shells and fringes, worn around the neck or arms by both sexes. Fig. 10 is a waist-belt made of the leaves of the young screw pine (*Pandanus andamanensis*), the bunch of leaves being worn behind. This is the ornament that is supposed to have given rise, in former times, to the idea that the natives had tails like horses. Fig. 11 is a waist-belt of shells (*Dentalium octagonum*). Fig. 13 is a torch of resin, wrapped in palm leaves, used when fishing, traveling or dancing by night. Fig. 14 represents a sounding board or drum. It is supported at an angle by a stick driven into the ground, as shown on page 89, and is sounded by striking with the foot or a spear.

On page 86 a group of household articles is depicted, such as bamboo buckets, baskets, mats, tongs and other things. Many of the native baskets are beautifully ornamented by weaving into them strands of an orchid root (*Dendrobium* sp.). The root is split lengthwise, and the inner substance is scraped away with a Cyrena shell. The skin is then cleaned and dried, when it turns brilliant metallic yellow in color.

The upper figure on page 89 shows the manner of capturing a turtle. The spear used has a bamboo shaft 18 feet or more in length, and a long stout line, to which is attached a barbed iron point. (See Fig. 2 on page 90). This point fits loosely into the end of the shaft. When the point enters the turtle, the shaft separates from it and floats upon the water. The man grasps the spear with both hands about midway of its length and springs with it into the water, thus adding the force of his weight to that of the blow.

The Andamanese dance is illustrated in the lower figure on page 89. The dance is usually accompanied by a song and chorus, the composer acting as leader, and beating the sounding board or drum. Another view of the drum is given in Fig. 14 on page 85. All join in the chorus, the women marking the rhythm by clapping the hands or striking their crossed legs.

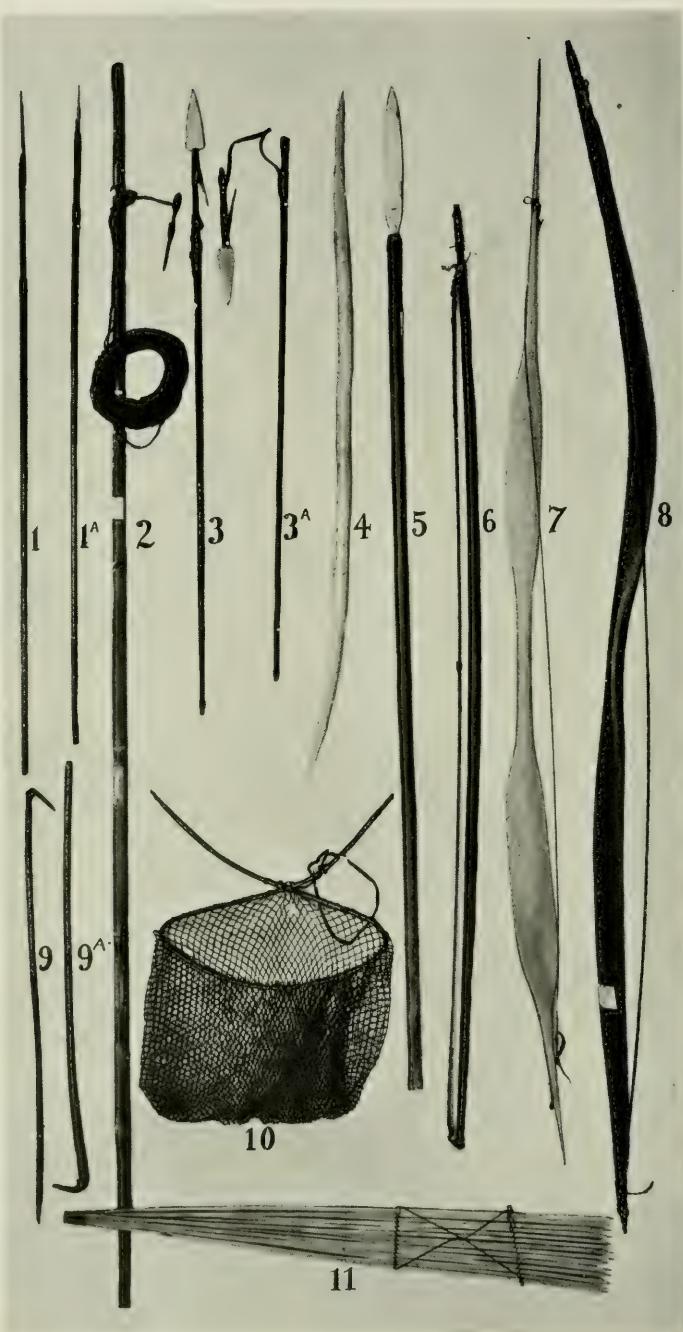
Some of the implements used in hunting and fishing are shown on page 90. The use of most of them is self-evident, but a few require special mention. Fig. 2 is a turtle spear like that shown in use on page 89. The arrows used in shooting the wild pig (Figs. 3 and 3a) are worthy of notice. The iron point, with its barb, fits loosely into the hollow end of the shaft, to which it is attached by a cord about eight inches in length. When the



SPEARING A TURTLE.



AN ANDAMANESE DANCE.



IMPLEMENT OF WAR AND THE CHASE.

pig is struck the arrow-head is pulled out, and the shaft, trailing along on the ground quickly becomes entangled in the brush, making the capture of the animal easy. The sticks (Figs. 9 and 9a) with the crook on one end are used for capturing crabs among the rocks. Fig. 11 is a wooden fish spear. It only remains to notice the two very curious sigmoid bows shown in Figs. 7 and 8. The former is used by the tribes of North Andaman; the latter by those of South and Middle Andaman.

CHARLES W. MEAD.

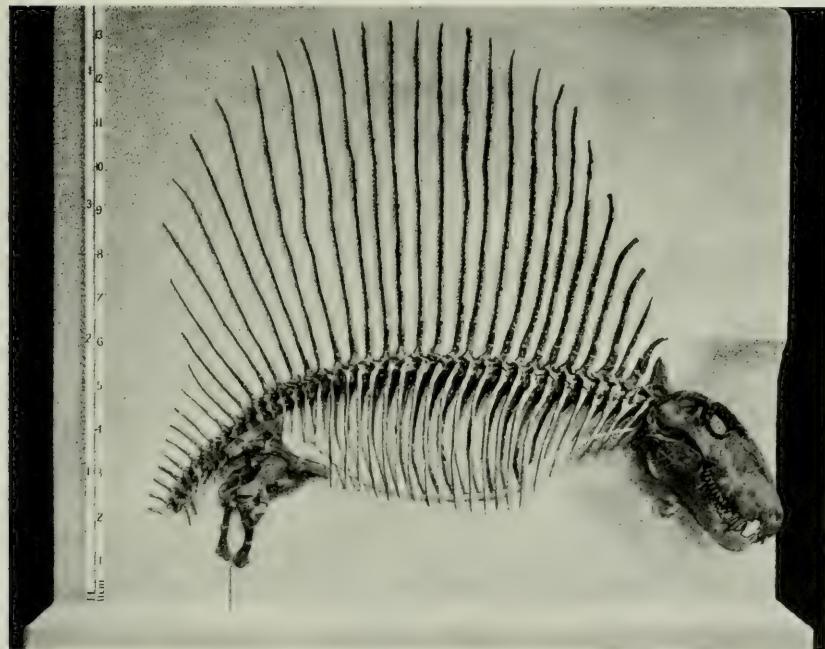


FIG. 1. SPINE-BACKED LIZARD DIMETRODON.

From the Permian of Texas. Skeleton discovered by Dr. E. C. Case in 1906.

THE OLDEST LAND REPTILES OF NORTH AMERICA.

Eighteen years ago, in 1891, the American Museum began to gather together its collections of the extinct quadrupeds of the Age of Mammals, the ancestors and predecessors of the living quadrupeds. Six years later, the scope of the work was enlarged so as to include the animals of the Age of Reptiles, which preceded the Age

of Mammals, more especially the Dinosaurs, those gigantic, long-legged land reptiles, as strange to our eyes as though from another planet. Finally, within the last few years, the Museum has begun the representation of the vertebrate life of the Age of Amphibians, which preceded the Age of Reptiles and includes the Carboniferous and Permian Periods of geology. With this era we pass into a world as remote from the world of the Dinosaurs as that is from our own. Its dominant land animals were amphibians, remotely related to the modern salamanders, and peculiar types of primitive reptiles wholly different from the reptiles of the Dinosaur era and from any living kinds. Less gigantic than the Dinosaurs or the great quadrupeds of the Age of Mammals, they are

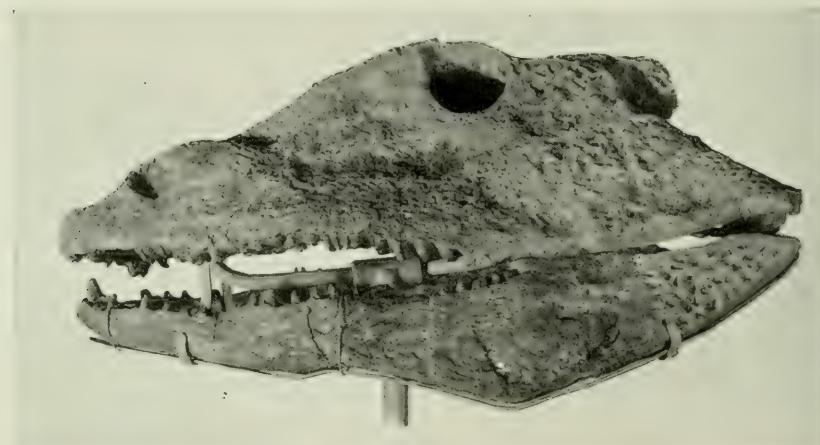


FIG. 2. ARMORED AMPHIBIAN ERYOPS. SKULL AND JAWS.

Cope Permian Collection, presented by Morris K. Jesup.

often most grotesque and peculiar. They are the first of land vertebrates, and in their clumsy and awkward proportions and construction, they impress one at every point with their imperfect adaptation to terrestrial life. The great vertebrate phylum was then but beginning to adapt itself to the more active life of the land, with its opportunities for evolution into higher types and more varied and complex modes of life than were afforded by an aquatic habitat. Probably most of these primitive land vertebrates were more or less amphibious; some we know were so. But with the assumption of a terrestrial environment came the opportunity for a more active life and continually higher development, as we see it in the successive geological periods down to the present time.

The purpose of this notice is to call attention to what has been and is being done by the American Museum towards exhibiting this ancient and wonderful Permian fauna which flourished during the later part of the Age of Amphibians. The first step was taken some years ago, in the purchase, through the generosity of the late President Morris K. Jesup, of the Cope Collection of Fossil Reptiles, which included the largest and finest series of Permian fossil vertebrates in the world. The specimens are chiefly from Northern Texas, the only region in which these rare fossils have been found in any considerable number. Professor Cope early realized the importance of the finds first made there in 1878, and had employed collectors there for many years. Owing to the difficulty and expense of preparation, the specimens had been very little worked up for scientific study and still less for exhibition.

In addition to presenting the collection to the Museum, Mr. Jesup provided a special preparation fund which has made it possible to keep two skilled preparators at work on this and other parts of the Cope collection for several years past. As a result of their labors, the principal specimens of the Cope Permian Collection have been extracted from the flinty concretionary matrix in which they occur, and a considerable number have already been placed on exhibition in the southeast corner of the Dinosaur Hall. The series includes a more or less composite skeleton of the *Naosaurus* or Ship-lizard (a photograph of which has appeared in a previous number of the JOURNAL), parts of the skeletons and skulls of other Spine-backed Lizards, a large number of skulls and two skeletons

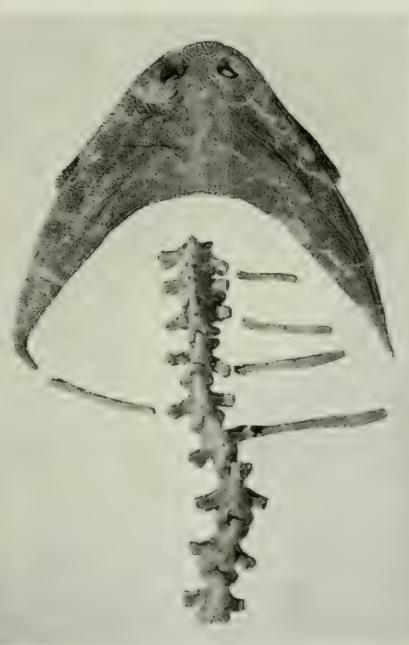


FIG. 3. ARMORED AMPHIBIAN DIPLOCAULUS.

Cope Permian Collection, presented by
Morris K. Jesup.

of the Armored Amphibians, *Eryops* (Fig. 2), *Diplocaulus* (Figs. 3, 4), *Cricotus* (Fig. 5), and others, and a series of skulls and other parts of the Solid-skulled Reptiles or Cotylosaurians.

It soon became evident that this wonderful fauna would well repay

an energetic search for additional and more complete specimens, therefore in 1902 the Museum sent Mr. C. H. Sternberg, and in 1906 and 1908 Dr. E. C. Case, into the Texas fossil field. These expeditions made valuable additions to the Permian collections. In particular, Dr. Case succeeded in 1906 in obtaining skeletons of the Spine-Backed Lizard *Dimetrodon* (Fig. 1) and the large solid-skulled (Cotylosaurian) reptile *Diadectes*, much more complete than any previously known. The

FIG. 4. SKULL OF ARMORED AMPHIBIAN DIPLOCAULUS.

Cope Permian Collection, presented by Morris K. Jesup.

first specimen has been placed on exhibition as a panel mount, the other is now under preparation. The most important specimen obtained by Dr. Case last year was a fine skull of *Diadectes*. By persistent and



FIG. 5. SKELETONS OF THE ARMORED AMPHIBIAN CRICOTUS.

Cope Permian Collection, presented by Morris K. Jesup.

thorough exploration of this and other Permian fossil fields we may expect to obtain a large series of skeletons of these strangest and least known of all our fossil vertebrates.

The scientific value of these specimens can hardly be overrated.

Very little is known, even to scientific men, about Permian vertebrates. There are not half a dozen scientific men in this country who have any considerable first-hand knowledge of them, or half a dozen museums in the world that possess any considerable collections, and nowhere else have the specimens been so carefully prepared for study and exhibition as in the American Museum. The skulls and skeletons recently prepared here have not yet been thoroughly studied, but they will supply most important evidence regarding the early history of the land vertebrates, the manner, the conditions, and the causes of their development, their relations to the modern reptiles, amphibians and mammals. Upon the imperfect evidence hitherto available have been built various theories and hypotheses of relationship and development, which will have to be revised and modified in many cases, in view of the new evidence already at hand.

W. D. MATTHEW.

A GROUP OF PECULIAR MOLLUSKS.

MR. A. DE COSTA GOMEZ has presented to the Department of Conchology an interesting group of shells of the mollusk *Vermicularia? nigricans* Dall (old nomenclature *Vermetus varians* D'Orb., var. *irregularis* D'Orb.). The specimen is a tightly coiled mass of tubes, a gorgon-like maze of tortuous pipes which look so much like the cases of the annelid genus *Serpula* that they appear rather incongruously referred to mollusks.

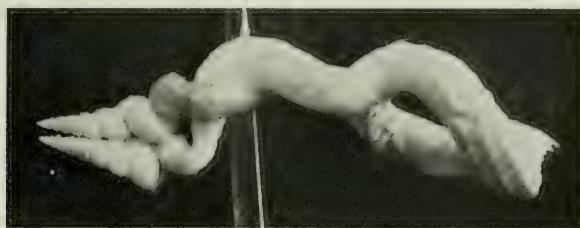
These anomalous mollusks were separated by Cuvier in 1830, and by him erected into an order. They are true prosobranchs, though in their shelly covering they have widely departed from any conventional shell design. The shells are usually attached to other shells or to corals, or they live in sponges, or again, as in this example, they unite to form large colonies. They are unisexual, oviparous, or viviparous, and the eggs are often found in the tubes. The animals are dark purple-brown in color with reddish dots. This species makes the so-called "worm rock" of West Florida. The masses of tubes are sometimes dangerous, like coral reefs, to boats in shallow water. Dall has observed patches 20 or 30 feet in diameter with the top nearly level and barely dry at ordinary low water.



A GROUP OF PECULIAR MOLLUSK SHELLS.

(*Vermicularia? nigricans* Dall.)

The specimen is interestingly varied in color, the tubes ranging from hyaline whites to soft sienna browns. Gasse's description of *Serpula* applies very well to these shells, "great and small heaps of contorted tubes, that look as if a batch of tobacco pipes had become agglutinated



VERMICULARIA? NIGRICANS DALL. (X2)

Two small shells from the group figured on p. 96.

together and strangely twisted in the baking." The shell begins in a close striated spine, the whorls of which relax as the tube is prolonged, the later growth becoming continually more erect. The specimen is from Clear Water Bay, Dunedin, Florida.

L. P. G.

MUSEUM NEWS NOTES.

SINCE the last issue of the JOURNAL the following persons have been elected members of the Museum: Life Members, MR. CHARLES LYMAN BRINSMADE and MRS. JOHN E. PARSONS; Annual Members, MESSRS. EDWARD B. AMEND, J. SANFORD BARNES, JR., D. M. BARRINGER, S. R. BERTRON, E. D. BIRD, HORATIO J. BREWER, C. T. CHURCH, HUBERT CILLIS, EVERETT COLBY, EDWARD LIVINGSTON COSTER, LAWRENCE GODKIN, GEORGE L. HARRISON, JR., HANCKE HENCKEN, THEODORE LYMAN, H. FAIRFIELD OSBORN, JR., H. F. OSBORN SANGER, RALPH SANGER and G. W. WILDER; MMES. HAMILTON FISH KEAN, H. FAIRFIELD OSBORN, M. GRACE RICHARDSON, RALPH SANGER and EDWARD THOMAS; MISSES GERTRUDE L. HOYT, BEATRIX JONES, KAUTZ-EULENBURG and JOSEPHINE A. OSBORN.

THE Museum has recently acquired through purchase from Mr. G. R. Cassedy, of Cañon City, Colo., an iron meteorite that will form a valuable addition to the series of meteorites in the Foyer of the

Museum. The specimen, which weighs 682 pounds, was found November 11, 1907, in Fremont County, Colorado, about 20 miles southwest of Cripple Creek. A complete description of the meteorite is reserved for a later issue of the JOURNAL.

THE thirteenth annual meeting of the Audubon Society of the State of New York, was held at the American Museum of Natural History at 3:30 p. m., March 18, 1909. The president of the society, Professor Henry Fairfield Osborn, presided. The report of Miss Emma H. Lockwood, secretary-treasurer of the society, showed that the activities of the organization in protecting the birds of the State and in supplying material for the use of teachers and others, was limited only by available funds. Mr. William Dutcher, the president of the National Association of Audubon Societies and chairman of the New York societies' Committees on Legislation, presented a report on current legislative matters with particular reference to a bill now before the New York Legislature, the passage of which would practically prohibit the sale of the plumage of all New York State birds for millinery purposes. Mr. Dutcher asked all the members of the Society to urge their representatives at Albany to support this bill. Following Mr. Dutcher's report, Mr. Louis Agassiz Fuertes, the well-known bird artist, made an address on birds and their music, which he illustrated with chalk sketches of the birds and whistled imitations of their songs. In connection with this meeting there was an exhibition of paintings of birds by Mr. Fuertes, which continued during the succeeding week.

LECTURE ANNOUNCEMNNTS.

MEMBER'S COURSE.

THURSDAY evenings at 8:15 o'clock. Doors open at 7:45 p. m. One lecture remains to be given.

April 1.— "The passing of Our Great Wild Animals and Means taken to Restore 'Them.'" By DR. WILLIAM T. HORNADAY, Director of the New York Zoölogical Park.

Illustrated with lantern slides.

PUPILS' COURSE.

THESE illustrated lectures are open to the pupils of the public schools when accompanied by their teachers and to the children of Members of the Museum on the presentation of Membership tickets.

Lectures begin at 4 P. M.

Friday, April 16.—“The Panama Canal.” By E. O. HOVEY.

Monday, April 19.—“Famous Rivers of the World.” By WALTER GRANGER.

Wednesday, April 21.—“Natural Wonders of our Country.” By R. W. MINER.

Friday, April 23.—“American Forests and their Uses.” By G. H. SHERWOOD.

Monday, April 26.—“Mediterranean Countries, Ancient and Modern.” By WALTER GRANGER.

Wednesday, April 28.—“The American Indian of To-day.” By H. I. SMITH.

Friday, April 30.—“Travels in the Western States.” By BARNUM BROWN.

LECTURES ON BIOLOGY.

ARRANGED by the Biology Departments of the Normal College and the High Schools of Manhattan. Illustrated with stereopticon views.

Thursday afternoons at 3:30 o'clock.

One lecture remains to be given.

April 15.—“Natural History of Animals.” By DR. HENRY E. CRAMPTON.

PEOPLE'S COURSE.

GIVEN in coöperation with the City Department of Education.

Tuesday evenings at 8 o'clock. Doors open at 7:30.

Two lectures by Professor A. D. F. HAMLIN on “The Architecture of Great Cities.” Illustrated with stereopticon views.

April 6.—“London.”

April 13.—“New York.”

April 20.—“Florence, Cradle of the Renaissance.” By MR. FRANCIS M. STRICKLAND.

April 27.—“Berlin, and Military Life in Germany.” By DR. HENRY ZICK.

Saturday evenings at 8 o'clock. Doors open at 7:30.

April 3.—"Child Labor in America." By MR. OWEN R. LOVEJOY.

April 10.—"The Children's Court." By MR. ERNEST K. COULTER.

April 17.—Subject and lecturer to be announced.

April 24.—"The City Beautiful, or the Planning and Embellishment of Cities." By MR. ARTHUR A. STOUGHTON.

MEETINGS OF SOCIETIES.

Public meetings of the New York Academy of Sciences and its Affiliated Societies are held at the Museum according to the following schedule:

On Monday evenings, The New York Academy of Sciences:

First Mondays, Section of Geology and Mineralogy.

Second Mondays, Section of Biology.

Third Mondays, Section of Astronomy, Physics and Chemistry.

Fourth Mondays, Section of Anthropology and Psychology.

On Tuesday evenings, as announced:

The Linnæan Society of New York, The New York Entomological Society and the Torrey Botanical Club.

On Wednesdays, as announced:

The Horticultural Society of New York.

The New York Mineralogical Club.

On Friday evenings, as announced:

The New York Microscopical Society.

The programmes of the meetings of the respective organizations are published in the weekly *Bulletin* of the New York Academy of Sciences and sent to the members of the several societies. Members of the Museum on making request of the Director will be provided with the *Bulletin* as issued.

The American Museum Journal

EDMUND OTIS HOVEY, *Editor.*

FRANK M. CHAPMAN,
LOUIS P. GRATACAP,
WILLIAM K. GREGORY, *Advisory Board.*

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Act of Congress, July 16, 1894.

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- No. 2.—THE SAGINAW VALLEY COLLECTION. By H. I. SMITH, Assistant Curator of Archaeology. December, 1901. *Price, 10 cents.*
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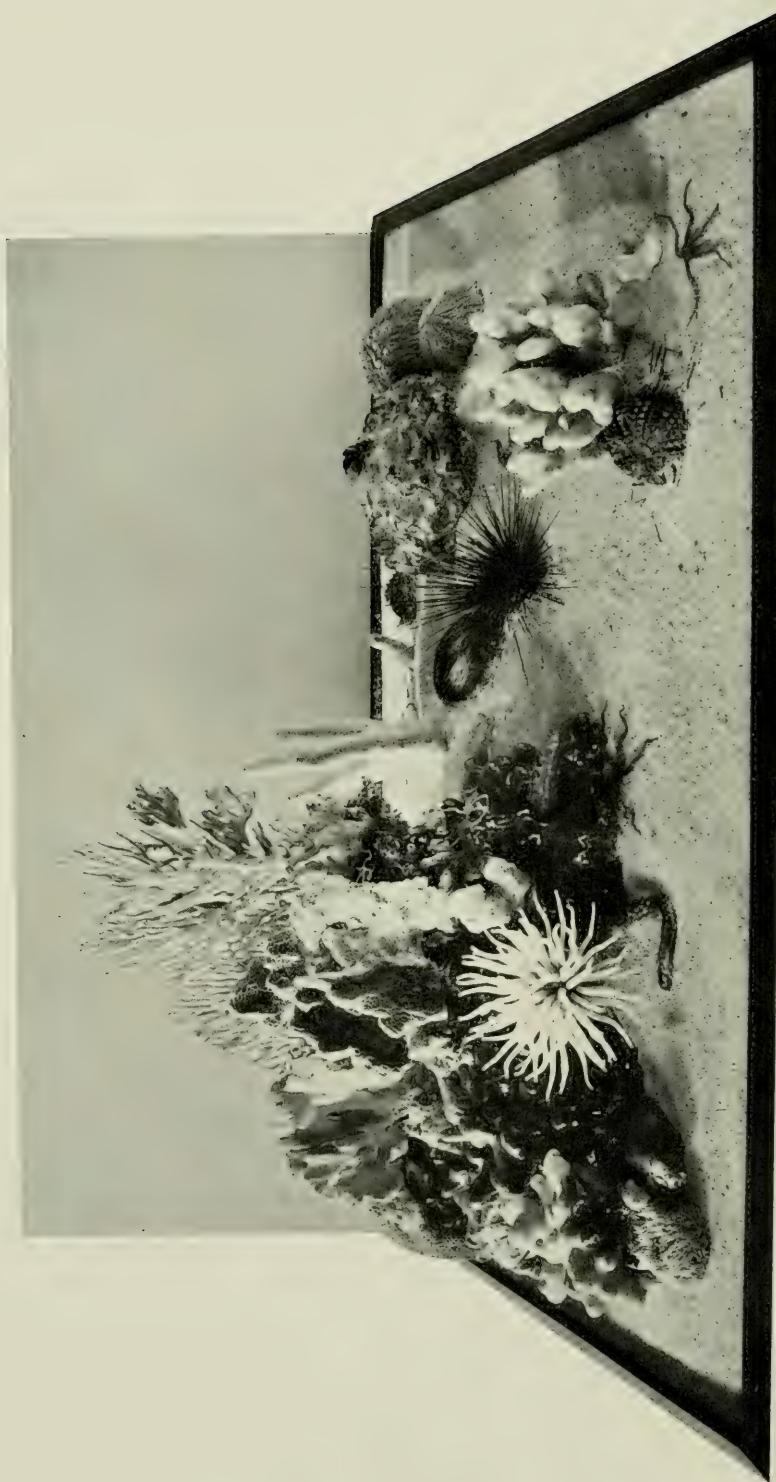
THE AMERICAN MUSEUM OF NATURAL HISTORY was established in 1869 to promote the Natural Sciences and to diffuse a general knowledge of them among the people, and it is in cordial coöperation with all similar institutions throughout the world. The Museum authorities are dependent upon private subscriptions and the dues from members for procuring needed additions to the collections and for carrying on explorations in America and other parts of the world.

The membership fees are,

Annual Members.....	\$ 10	Fellows.....	\$ 500
Life Members.....	100	Patrons.....	1000

All money received from membership fees is used for increasing the collections and for developing the educational work of the Museum.

The Museum is open free to the public on every day in the year.



The American Museum Journal

VOL. IX

MAY, 1909

No. 5

THE SERIES OF PROTOZOAN MODELS.

THE minute one-celled organisms known as Protozoa form a group of immense importance both from a biological and an economic standpoint. Swarming in countless millions in both fresh and salt water, and at times even in the bodies of other animals, they are the most abundant and most widely distributed of all life. Many of the smaller marine and fresh water creatures depend upon them for food, and among them may also be found some of the most important disease-causing parasites. The calcareous and siliceous skeletons of others settle to the sea bottom by thousands as the animals die, to collect in layers often many feet in thickness. The calcareous skeletons sometimes become compacted into solid rock, and thus are of great geological importance, many extensive cliffs of lime-stone and chalk having been formed in this way. The siliceous skeletons form the so-called "Radiolarian ooze," which is the source of the "Barbados earth" used in manufactures for polishing and grinding, and which forms no inconsiderable part of the island of Barbados. Though this vast world of creatures is so important and surrounds us on every side, penetrating, as it were, all the interspaces between the larger forms of life, yet it is invisible to our eyes, and were it not for the compound microscope, we should be absolutely ignorant of it, except in its effects.

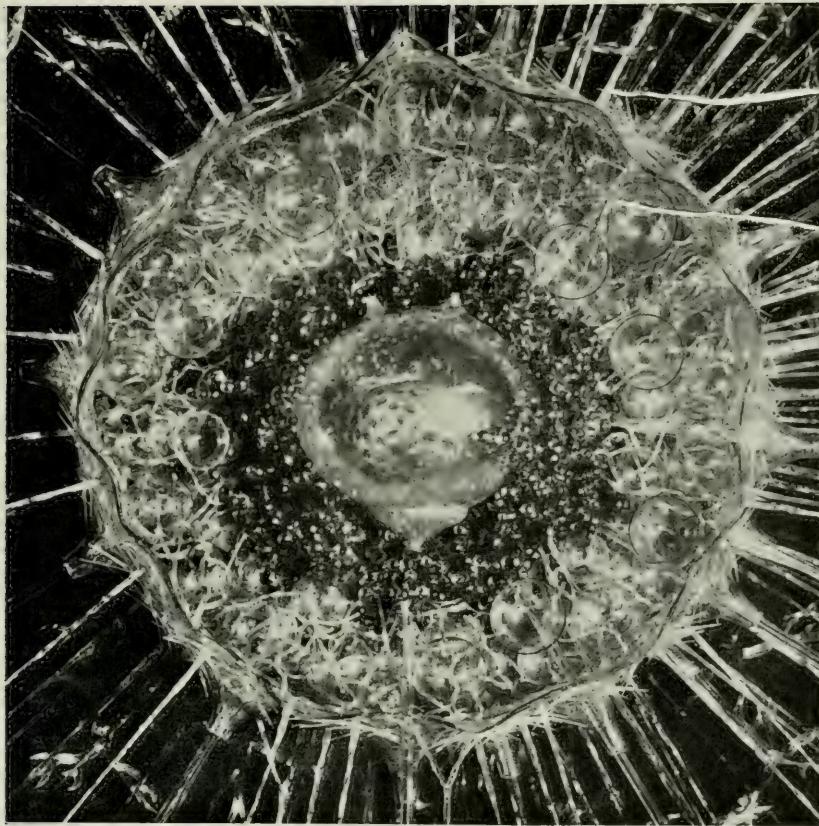
The Museum is at present completing its series of greatly enlarged models of the typical Protozoa, and one of the most striking of these has recently been finished for exhibition. It is shown in the accompanying illustrations (pages 104 and 105). This Protozoan (*Auloceros elegans* Häckel) belongs to the group Radiolaria, so called because of the radiating siliceous or glassy skeleton which characterizes these forms. Sometimes these are of great complexity and beauty, and though the Protozoa as a whole are the simplest in structure of all animals, being composed of but a single cell, certain forms among the Radiolaria attain considerable complexity of intracellular structure, as may be seen in the figure.

In the middle of the animal is the oval nucleus, which is the essential center of its life activities, and which is itself extremely complex both in structure and in function. It is inclosed in a transparent double-walled "central capsule," in this species red in color, containing a portion of the living protoplasmic cell-substance (*endoplasm*) which is continuous with the surrounding outer protoplasm (*ectoplasm*) through openings at the summits of the three conical projections. The central capsule is partly imbedded in a mass of granular pigmented substance (the



THE PROTOZOOAN, *AULOCEROS ELEGANS* HACKEL.

Glass model, greatly enlarged. Made by H. Müller under the direction of R. W. Miner.



MODEL OF *AULOCEROS ELEGANS* HÄCKEL.

View to show internal anatomy.

phaeodium — dark green in this species), which surrounds and apparently issues from the upper opening of the capsule. It is probably of considerable physiological value to the organism and may be either associated with nutrition or a product of an excretory nature retained within the body for some secondary reason. The real explanation of its function, however, is still uncertain.

The true protoplasmic living-substance outside the capsule is distributed for the most part in the form of a network, which secretes and is imbedded in a jelly-like structureless matrix. This matrix is crowded with bubble-like, liquid-filled hollows (*alveoles*), which are so numerous that they reduce the animal substance to very narrow limits and give a foam-like appearance to this part of the structure. (In the glass

model each alveole is represented by a separately blown glass sphere.) Radiating outward from the central capsule may be seen the supporting glassy skeleton of the creature, each ray in this species separate, and branching antler-like at the tip. Particular notice should be taken of the delicate radiating filamentary projections of the animal body between the rays of the skeletal structure. These are the "pseudopods," prolongations of the living protoplasmic network which reach out in all directions and act somewhat as tentacles, seizing upon the minute animals which form the prey of the creature, and drawing them down within the body to be digested and absorbed. This ingestion may take place at any point of the surface, since there is no mouth and no definite stomach. The pseudopods are used also for locomotion.

In other related species all parts of the skeleton are welded rigidly together, often forming complicated and beautiful patterns, as in the genus *Gorgonetta*, the skeleton of which is represented by a model now on exhibition in the Museum (page 107).

Roy W. MINER.

A NEW MARINE HABITAT GROUP.

THE illustration on page 102 represents a group recently installed by the Department of Invertebrate Zoölogy. This group shows an animal community such as may often be found in the Bahamas not far below the exposed edge of a coral reef. It includes Brittle-stars, Sea Cucumbers, Cake-urchins and Sea-urchins, especially *Diadema setosum*, two fine specimens of which are represented bristling with long spines, like hedge-hogs. Coiled in and out through the crevices of the coral-rock is the brownish body of a *Synapta*, studded with knobs and displaying around its circular mouth-opening an expanded ring of plume-like tentacles. Conspicuous at one side of the group is the flower-like Pink-tipped Sea Anemone (*Condylactis gigantea* Weinland), which nestles at the base of a coral growth and is partly concealed by the brown slimy surface of an encrusting sponge. Above this rises the delicate fern-like colony of a Stinging Coral (*Millepora alcicornis*) together with a fragile, paper-like species (*Millepora plicata*), while other sponges and corals project here and there from the sand. The material for the group was collected in 1908 by Dr. B. E. Dahlgren and Mr. H. Müller off Andros Island in the Bahamas, and was for the most part prepared by the former in the Museum.



GLASS MODEL OF SKELETON OF PROTOZOA, *GORGONETTA MIRABILIS* HÄCKEL.

Very greatly enlarged. Prepared by H. Müller.

MODEL OF THE GOBLIN SHARK.



A LIFE-SIZE model of a very rare and remarkable Shark from Japanese waters, a photograph of which is shown on this page, has recently been finished for exhibition in the Museum. The model well represents some of the animal's peculiar anatomical features, the most striking of which is the "rostrum," a paddle-shaped affair, richly supplied with blood-vessels and nerves, which projects forward from above the mouth and is probably used to feel about on the sea-bottom for prey. The long tapering body with extremely powerful tail indicates an adaptation for great speed. In life the shark is somewhat translucent and presents a peculiarly ghost-like appearance as it darts through the water. The alcoholic specimen from which the model was made is in the Museum collection and has been constituted the type of a new species (*Scapanorhynchus jordani*) recently described in the Museum "Bulletin" by Dr. L. Hussakof. The model was prepared by Mr. Dwight Franklin, under the direction of Mr. R. W. Miner, and is four feet five inches long.

DR. L. HUSSAKOF, Assistant Curator of Fossil Fishes, went to Europe in April to make a study of the ichthyological collections of the leading museums. The last few weeks of his stay will be spent at the zoölogical station at Naples.

NEWS FROM THE MUSEUM'S ARCTIC EXPLORERS.

EARLY in April letters written the middle of October were received with news from the Museum's Arctic Alaska expedition.

The letters come from Flaxman Island, situated in the Arctic Ocean off the northern coast of Alaska and about midway between MacKenzie Bay and Point Barrow, and record the union of Mr. Stefánsson and Dr. Anderson, who followed different routes after leaving Herschel Island in August.

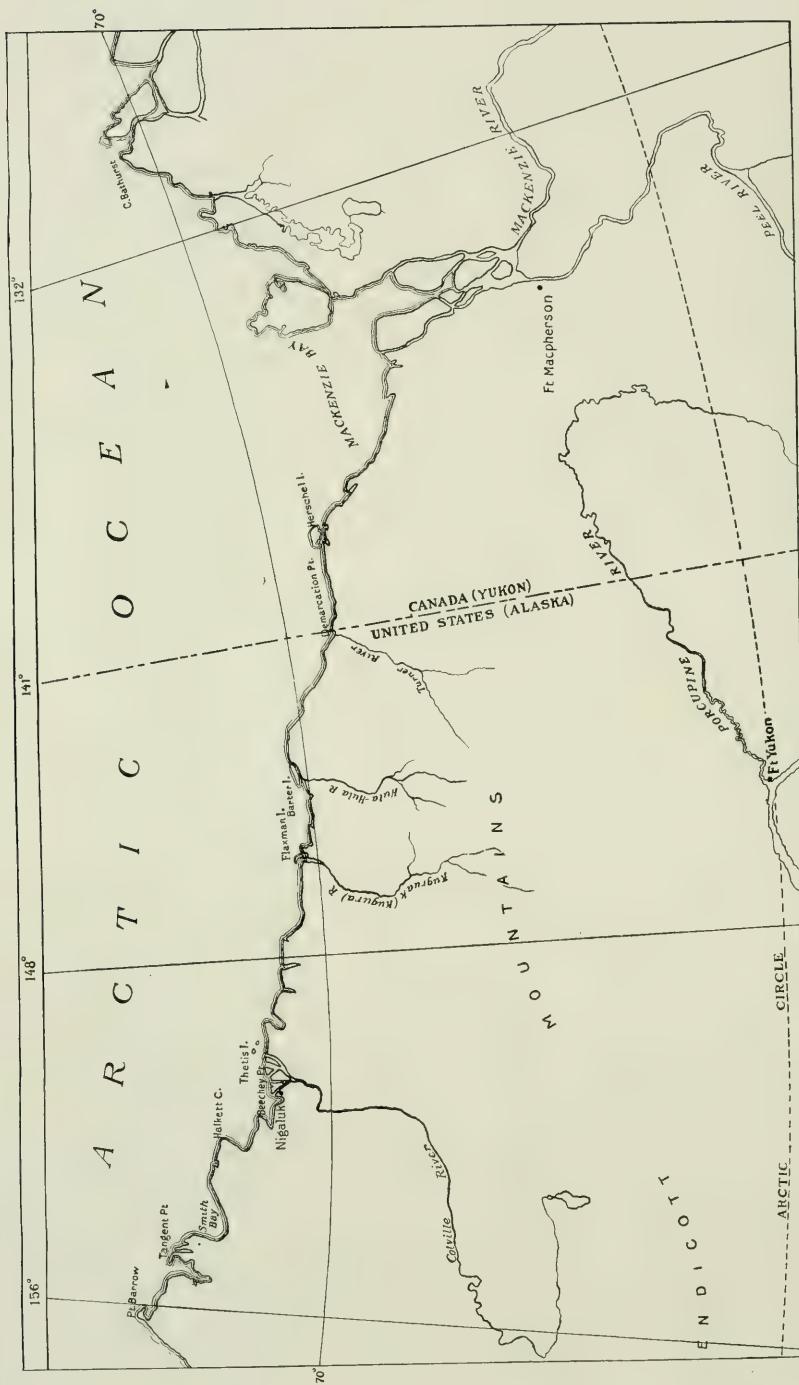
The route taken by Mr. Stefánsson was in part shown in the November, 1908, JOURNAL, and later facts were given in the March, 1909, number quoted from a letter written late last September. The expedition proceeded westward as far as Point Barrow; then on a return trip toward Flaxman was frozen in at Smith Bay, west of Cape Halkett, cached goods there, made a sled and continued slowly eastward. Dr. Anderson and his party cruised along the coast westward from Herschel Island until September 6, when their whaleboat was frozen in west of Barter Island and the men with their seventeen dogs had to proceed with sleds, feeding "on the country."

It is a satisfaction to know of the well-being of all members of this polar expedition up to October 19, 1908, when the Arctic winter was well started, and this feeling is intensified by a message that has come since the letters arrived. A telegram received by way of Seattle April 8, which was dispatched from Nome, Alaska, on April 6 and was originally dated at Point Barrow February 14, reads as follows: "Telegram of December fourth received. Well. Winter camp lower Colville. Game scarce. Nobody starving. Plans unchanged. Expect meet Whalers Baillie [Island]. Stefánsson."

Realistic accounts of the happenings of the weeks en route to Flaxman Island are given in the following quotations:

FLAXMAN ISLAND, ALASKA,
October 15, 1908.

***** We have made the trip from the delta of an unnamed river about 50 miles east from Point Barrow eastward to Flaxman Island, starting Friday, September 18, and arriving here Monday, October 12. Our trip was unusually slow for several reasons. I delayed some three days to visit



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The Stefansson-Anderson Expedition left Herschel Island in August in two parties pursuing different routes to meet at Flaxman Island in October. The winter camp has been on the lower Colville.

MAP OF ARCTIC ALASKA.

THE STEFANSSON-ANDERSON EXPEDITION LEFT HERSCHEL ISLAND IN AUGUST IN TWO PARTIES PURSUING DIFFERENT ROUTES TO MEET AT FLAXMAN ISLAND IN OCTOBER. THE WINTER CAMP HAS BEEN ON THE LOWER COLVILLE.

the Schooner "Olga" beset in the ice off Cape Halkett as a letter from there has already informed you;¹ we lost about five days at various rivers, either through waiting for them to freeze over or in taking stuff across their deltas in half-loads; we employed about five days in hunting, skinning and caching (on high wooden platforms) seal and deer. We got one seal and twelve deer. Of the deer, I saved five specimens for Dr. Anderson. Three of these were killed in the Colville delta, and two a little east of it — three fine bucks, one old female, one young female (female and young with horns in velvet). The deer show different stages of pelage — an old buck was in summer color still, while the doe was fully changed and the others ranged between. We also secured some specimens of mice, weasels and birds.

At Flaxman Island we found Dr. Anderson and the three natives, all well and Dr. Anderson reasonably satisfied with the fall months, though he had had a rather complete change from whitemen's diet and had been compelled at one time to eat up his mouse bait (5 lbs. of rolled oats). His party had lived on squirrels and seal oil for a time, and later, on deer, fish and grouse.

Off Point Tangent I put some of our supplies and some we were carrying for Leffingwell aboard the schooner "Rosie H.", whose captain, Fritz Wolki, promised to take Leffingwell's stuff to Flaxman and mine as far as he could go. He was frozen in here, so we have here the following stores: 27 sacks flour, 100 lbs. triscuit, 60 lbs. pilot bread, 80 lbs. bacon, 20 gallons coal oil, 4 tanks alcohol; this besides some of our ammunition, which we brought from the east.

These stores are, of course, by no means sufficient for our maintenance, nor are they, even if taken with our stuff in Smith Bay, where our boats were frozen in. We shall, therefore, leave here as soon as Dr. Anderson and I get our letters written — probably next Monday — and go looking for game. Dr. Anderson wants to try getting some specimens of sheep, so he with two natives will go to the mountains by way of the Kugruak (on maps "Kugura") River, while the rest of us go west to near Beechey Point. Here we already have 8 deer cached and hope to get more, while some of us will try to get seal outside the Thetis Islands, which are off shore just east of the Colville. If threatened with starvation, Dr. Anderson will come back to Flaxman and get the flour from the "Rosie H.", while if we fail to get game, we shall go westward to Smith Bay where our boats are. Just now we are getting some seal here at Flaxman — from one to three per day — but it is our opinion that these will not last, for the floe ice is very heavy off shore and all open places will soon freeze. Most of even those natives who habitually

¹ Published in this JOURNAL for March, 1909, p. 67.

live at Flaxman are going elsewhere for the winter. Our special anxiety is for the dogs, I now have eleven and our natives twelve more, inclusive of three pups. If the dogs should die, we should be severely handicapped for next year.

I should have liked to go to Herschel Island now and up to Ft. Macpherson (a two months' round trip) to meet the winter mail and reply to any letters you may send by it, but as Capt. Wolki will gladly carry our letters to Herschel and as this is the best season to accumulate a little game and fish (before the sun leaves us), I have decided not to pay attention to anything but the problem of making a living.

If we can subsist near the Colville, as we shall try to do, we shall incidentally see a good many of the Colville people probably; if things go exceedingly well, I may even be able to get far enough inland to see most of them. When the days get long I want to make a trip to Baillie Island [off Cape Bathurst] and with open water I expect to visit the Colville people when they gather for trade at the delta village of Nirglik [Nigaluk, on the map], while we shall also probably be able to do the much-desired digging on Pingok (the big island off Beechey Point). These are the hopes and plans for the spring.

It is the intention of Captain Wolki of the "Rosie H." to winter in Banks Land next year. He says he will take us and our gear down there and (weather permitting) will land us where he lands, or elsewhere if we desire. He will wait some time for some of his own incoming supplies at Baillie Island, and will take aboard there anything we have for transportation. We shall therefore gradually take our stuff to his ship this winter and either precede or follow him with our boats to Baillie Island — according to the season and circumstances. Then we shall go to Banks Land, or elsewhere, as seems best. From information secured by natives who were with Captain Mogg in Victoria Land last year, we now know there are people on Banks Land, though none have ever been seen there either by the early English explorers or by whalers coasting along the west shore.

A second letter written by Mr. Stefánsson two days later considers their need of ammunition and like supplies, and closes with the reassuring sentence: "You have, of course, no reason to worry about us; we are pretty well off."

Many interesting facts concerning the zoölogical work of the expedition are given in a letter from Dr. Anderson under date of October 14; while definite information as to plans for the immediate future are stated not only in the letter proper, but also in a postscript under date of October 19.

FLAXMAN ISLAND, ARCTIC OCEAN, ALASKA,
October 14, 1908.

* * * * * I started west with three natives in a whale-boat and a large skin canoe or umiak about 25 feet long, with the intention of cruising along the coast to Flaxman Island to meet Stefánsson early in September. We had seventeen dogs and ourselves to feed "on the country," as we started with about one sack of flour, four or five pounds of bacon, a little tea and coffee and about fifty pounds of dried fish. We had several gill nets and were obliged to stop and fish a good deal at various places. Fishing was only fairly good along the coast; we caught from ten to forty whitefish nearly every day and a few salmon trout, but could not get very many ahead.

We saw seven caribou and killed one August 18, at Demarcation Point, the international boundary. Our whaleboat was frozen in at a reef a little west of Barter Island, Alaska, on September 5, about fifteen days earlier than usually happens. We succeeded in drawing it up to an apparently safe place on the reef by means of block and tackle which we had with us, cached one chest of specimens and part of our goods with the boat and broke ice and dragged the skin boat over the sandbars to the mainland at the mouth of Okpilak River, taking part of our supplies with us.

We killed a good many squirrels here (*Spermophilus parryi*) which helped out our commissariat and made a few "skins" also. As we had only two or three days' provisions on hand, and as the ice was too thin for sled travel, we made pack saddles for several of our dogs, and started September 9 across the half-frozen tundra to the place where the Hula Hula River emerges from the mountains, and the swift water remains open much later than near the coast. The lower coast of both the Okpilak and Hula-Hula froze over at the time the "young ice" formed in the sea lagoon. Snow fell on September 10 and has remained on the ground ever since.

At the fishing place on the Hula-Hula River we caught several hundred salmon trout (two species), many specimens being from six to eight pounds in weight. One day we caught 284. We also killed three caribou on September 14, but my native inconsiderately ripped the hides off and ruined them for specimens while I was chasing the fourth individual of the herd. We remained up-country over two weeks, returned to the coast for our two sleds, hauled the fish and meat back to our camp on the coast, and started as soon as possible for Flaxman Island, the sleds pretty heavily loaded with most of our fish and meat. We arrived at Flaxman Island October 4, after a rather hard trip along the coast, owing to rough frozen in blocks of ice in places and salt slush in others.

We had seen only one family of natives camped at Barter Island and two sailing in a whale boat late in August, and they had told us that Leffingwell

had left Flaxman Island and nobody was there now, as the natives were hunting in the mountains. Hence we did not know what we should have to do on arriving there, as it seemed probable that Stefánsson had been frozen in also. On arriving at Flaxman Island, we found the whaler "Rosie H." of San Francisco frozen in and wintering here. Captain Fritz Wolki reported that he had passed Stefánsson and Storkerson in Smith Bay with a sloop and a whaleboat * * * *.

Our flour, bacon and all "civilized foods" had been exhausted by August 30, the coffee very soon afterward, and from that time until we reached Flaxman, October 4, we were strictly on a meat and fish diet. We succeeded in pulling through without going hungry at any time, but a man misses the bread after a few weeks.

***** In sending out part of our supplies from New York, I think it would be desirable and economical to send at least part of the lighter materials packed in substantial tin-lined chests which could be used for packing and transporting specimens in the North. The three collecting chests that I took out with me are filled with specimens (bird and mammal skins) and cached, one at Herschel Island and two near Barter Island, and I shall try to send the specimens out next summer. If I get no more chests, I shall have to send out these small skins in what wooden packing boxes I can find or patch together, and take chances of having them damaged by rats, mice or dampness in a long whaling voyage before reaching San Francisco.

* * * * * If the natives know that a man wants rare or unusual specimens, they often bring them in, and expect a present of some kind, or at least the ordinary fur trader's prices. For example, there is a species of badger found near the mountains a few miles from this coast, rather rarely, and what few the natives bring in are sold for about one dollar apiece. We may or may not be able to catch a specimen ourselves next spring. I have seen a native fur coat made of badger skins, and the fur is much denser and softer than the southern badger, which appears to reach its northern limit on the Athabasca River, around Pelican Rapids.

It is probable that we shall pass most of the winter and spring in the neighborhood of Smith Bay, near our "grub pile," spending part of the time a little farther east around the mouth of the Colville River.

Stefánsson will probably start west very soon, while I go into the mountains near here with one of our natives, up either the Hula Hula or Kugura River, and try to get some mountain sheep before the snow gets too deep. This part of the Endicott Range is said to be the best mountain sheep country left in Alaska, and the natives kill a good many at all seasons of the year. We met one native near Barter Island in August, who had just returned from the mountains, after killing twenty sheep. The caribou are

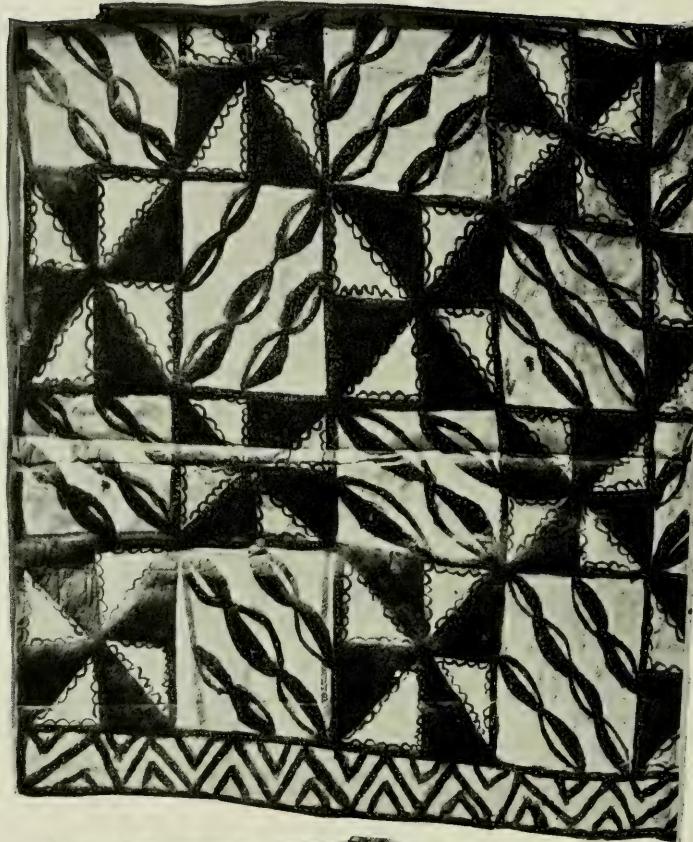
killed in considerable numbers all along this coast and are said to be working westward in greater numbers every year to the Colville River region and up towards Point Barrow. The natives say that the deer here are smaller than those east of the Mackenzie River. I have a very dark August specimen taken at Demarcation Point, on the Canadian side, Yukon Territory. I have a fair series of the two species of ptarmigan found here, all in the mottled transition plumage, a few small mammals, including a peculiar shrew from the Hula-Hula (at least different from any I have seen before). I made a good many bird skins along the coast in August and September.

Captain Wolki of the "Rosie H." is something of an ornithologist, and has collected bird skins and eggs in the Arctic Ocean for many years.*** He knows the species very well and is apparently a very close observer. He has a house on the Horton River, Franklin Bay, east of Baillie Island, where he lived and traded for four years. He says he has a collection of skins there now, including among others pomarine and long-tailed jaegers, golden eagle, hawks, and gulls. He has taken great numbers of eggs of the snow geese there, also whistling swan, American white-fronted goose, and black brant, in fact, nearly all the northern species except Ross's snow goose and yellow-billed loon. He says he saw one white pelican at the mouth of Mackenzie River and six spoonbill ducks taken at Horton River, both species being unknown to the natives. The Eskimo, by the way, distinguish between the different species better than most white men, and have names for nearly all the species.

October 19. Mr. Stefánsson left for the west to night with Billy Akpek and his wife and expects to spend some time deer-hunting around the Colville. I shall start east to-morrow with Ilavinerk and his wife in company with Capt. Wolki's outfit, bound for Herschel Island. We shall ascend the Hula-Hula River just west of Barter Island for a few weeks hunting for mountain sheep, together with any other specimens we can get in the mountains. We shall stay until we get a good series of specimens, or get starved out, then retreat to Flaxman Island and go westward from there.

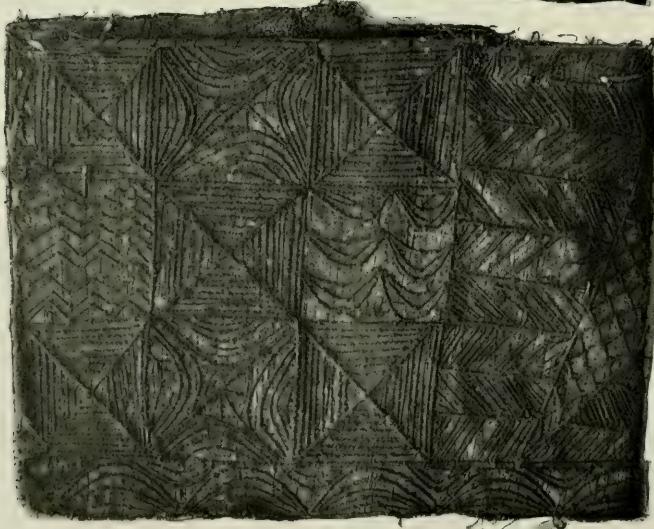
PRESIDENT HENRY F. OSBORN will attend the Darwin Memorial celebration at Cambridge University, England, June 22-24, as the delegate of the American Philosophical Society. Director H. C. Bumpus will attend the same celebration as the delegate of the Museum and then will go to Geneva, Switzerland, to represent the New York Academy of Sciences at the 350th anniversary, July 7-10, of the founding of the university there.

FIJIAN CLOTH.



STENCIL PATTERN.

The Fijians make "tapa", their native cloth, from the inner bark of paper mulberry, rubbing with dye over a stencil to give it a pattern.



THE FIJIAN COLLECTION.

THE Museum has recently secured, as a gift from Mrs. Morris K. Jesup, a valuable collection from the South Seas. This accession, containing more than two thousand specimens, comes largely from the Fiji Islands and amply represents most features of the culture of the native inhabitants.

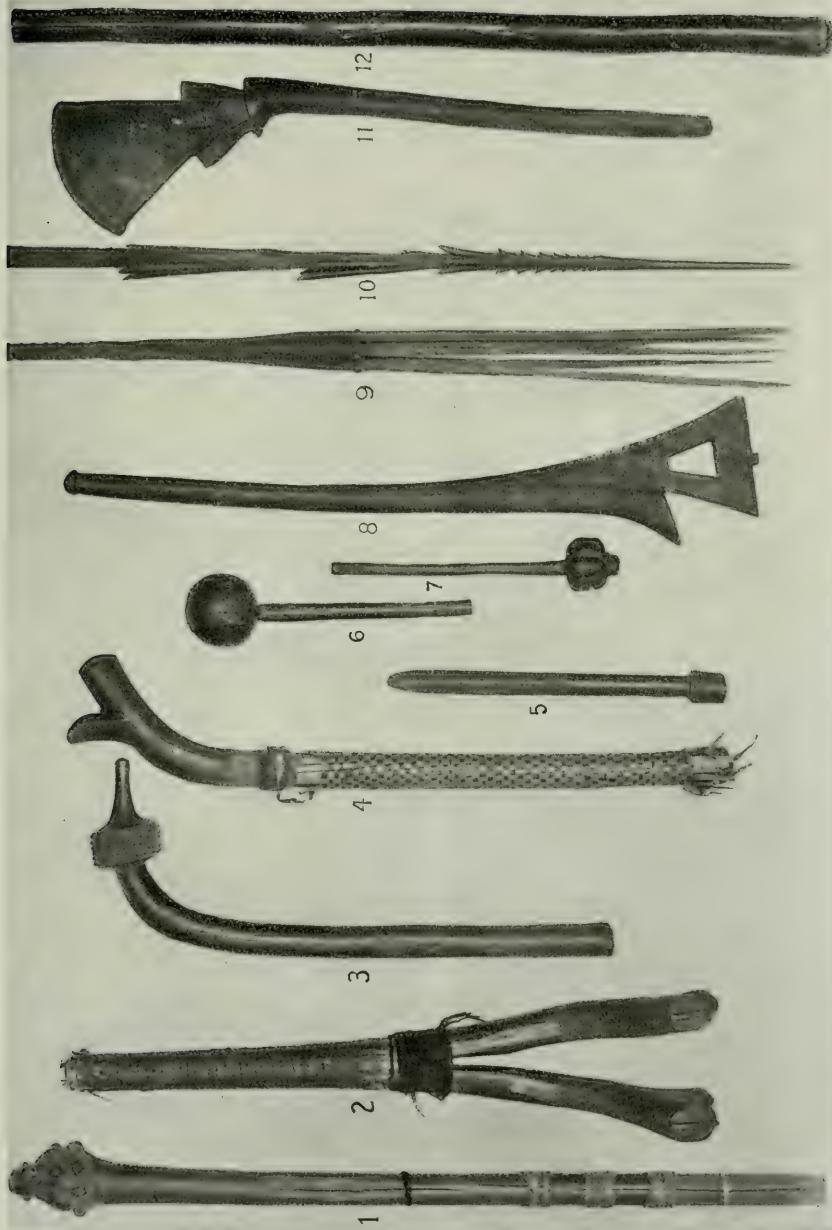
The Fijians, while resembling the Melanesians in physique, speak a language related to that of the Polynesians; also they share many cultural traits with the Polynesian inhabitants of Tonga and Samoa, with whom they have been in intimate contact for a long period. For instance, like their eastern neighbors, the Fijians drink kava, a stupefying beverage prepared from the roots of the plant *Piper methysticum*; and the new collection contains an imposing array of the bowls used in the process of kava making. Both preparation and drinking are accompanied by a great deal of ceremony. Young men, in public assembly, chew portions of the roots, then deposit them in the bowl, which is afterwards filled with water. Next a special official is entrusted with the task of straining the liquid, while hundreds of spectators watch his movements, imitate his postures and join in a choral chant. When the kava is ready for use, a prayer is recited by a herald, and the king, after pouring out a libation, drinks from a cup made from the half of a cocoanut. To be served after the sovereign is a great honor usually awarded for some distinguished personal service. A curious custom connected with the kava ceremony is the voicing of a toast after each draught. The drinker may express a wish for favorable winds, for plenty of fish or an abundant crop, or may set forth some other hope depending on his profession. Frequently, this ceremony is followed by a feast of yams, taro, figs and nuts.

One of the most notable achievements of the South Sea aborigines is the ornamentation of their tapa or native cloth, and here again the collection furnishes interesting evidence of both material and method. Tapa is manufactured from the inner bark of the paper mulberry, strips of which are beaten with a mallet and joined together with arrow-root paste to make the necessary size. Pattern-boards or stencils are constructed from large palm leaves, the designs consisting of coarse fibers or twigs sewed on to the leaf foundation. The cloth is placed over the stencil and rubbed with a dye until the pattern of the orna-

mentation is transferred. Fijian specimens, both of the finished product and of the stencils employed in its decoration, are shown in the illustration on page 116.

Other objects typical of the South Sea area generally, such as adzes, fly switches and tattooing implements are also adequately represented in the collection. There are numerous throwing-clubs, short sticks terminating in a knob, formerly carried in the girdle and used as the instrument of assassination. The collection contains a very large series of clubs of varying shape; some are obviously recent productions fashioned in imitation of guns. Many of these weapons have a carved decoration, which usually takes the form of a zigzag pattern of some kind. Part of them are wrapped with cordage, others with a checker plaiting. A weapon differentiating the Fijians from their eastern neighbors is the bow, which occurs in Polynesia merely in the form of a toy. A small assortment of Fiji earthenware (page 121) is of considerable interest, as all of the Polynesian tribes lack pottery and are obliged to prepare their food by baking or roasting.

One of the most valuable specimens is the model of a bure, or temple. This building was usually erected on a platform or mound, rendered accessible by a notched plank. From this eminence the bure rose to the height of about thirty feet. As nails were entirely unknown to the Fijians prior to European contact, they fastened together the posts and rafters by means of sinnet, the native cordage, prepared from the dried fibers of the cocoanut husk. In the construction of a temple, an immense quantity of sinnet was used for decorative purposes, so that from a distance the whole house seemed to be built of braided cord. Before lowering the corner posts into their holes, the Fijians offered human sacrifices to propitiate the deity of the temple; sometimes men were placed standing in each post hole and buried alive by the side of the post. The setting up of the first pair of rafters was solemnized with a cannibal feast, and a similar celebration took place as soon as the building was completed. The human bodies were baked in ovens. The forks or dishes used in eating human flesh were strictly "taboo," that is they were religiously reserved for this purpose under penalty of death. The Museum collection contains several of these cannibal forks and flesh-racks (page 121). Although serving as a council-chamber, a place for entertaining friendly visitors, and even as a sleeping-place for the most eminent residents of the village, the principal function of the



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FIJIAN CLUBS AND SPEARS.

1 to 5, and 12 — Various types of clubs. 6-7 — Throwing clubs. 8 and 11 — Gun clubs. 9-10 — Spears.



MODEL OF BURE OR TEMPLE.

Nails being unknown, cordage was used to fasten together posts and rafters.

bure was for religious ceremonies. Here votive offerings of food and whale's teeth were presented to the deity. Here also the native priest fell into a trance, during which he held communion with supernatural powers, whose decision on the question at issue was afterwards announced to the populace.

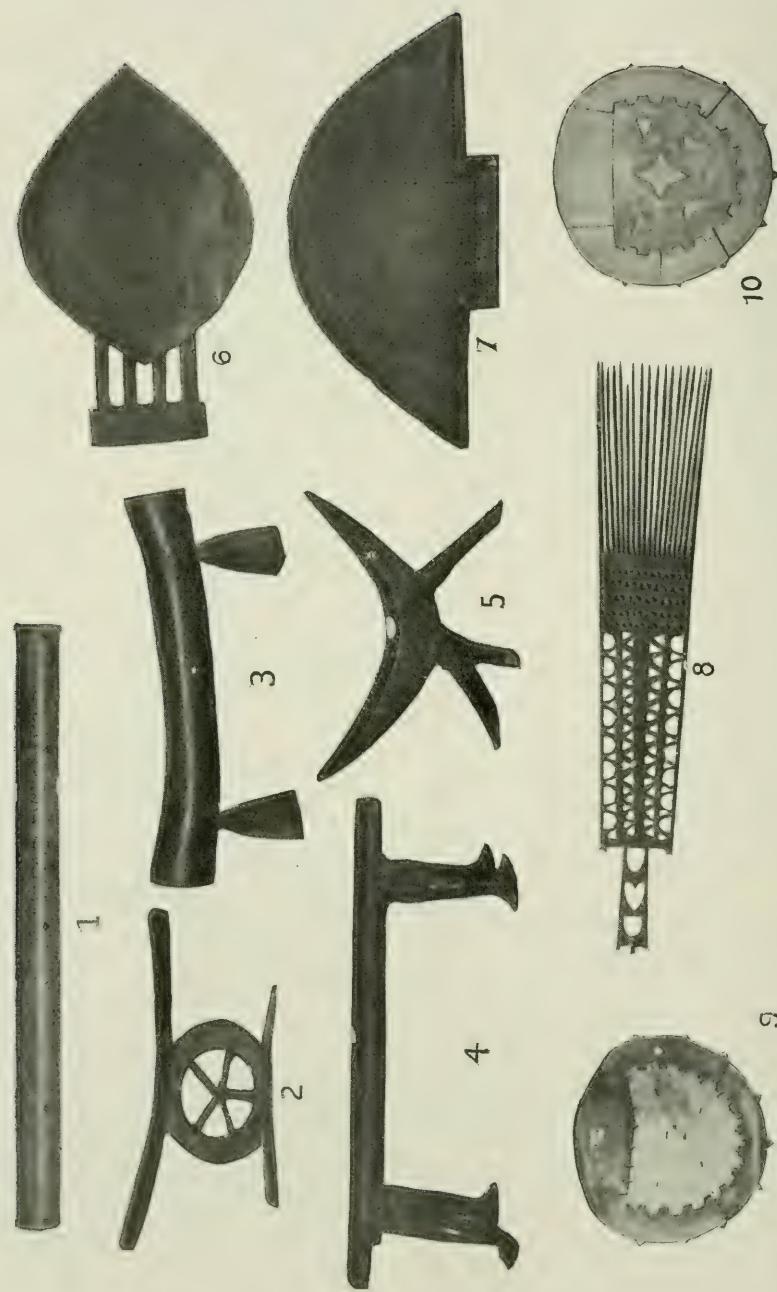
While the temple illustrated the architectural skill of the Fijians, which is superior to that of all other Oceanians excepting the Maori of New Zealand, their craftsmanship in other directions is shown by the variety of their neck-rests and the attractive open-work decoration of their combs. (See plate on page 122.) Oil and food dishes of wood are of rather crude execution, but interesting in shape. Very artistic effects are produced in the breast-plates of shell bone, which are tastefully decorated with inlaid patterns.

The objects illustrated here and other material selected from the collection have been installed temporarily in a wall case in the northeast corner of the Siberian Hall (No. 101) on the ground floor.

ROBERT H. LOWIE.



CANNIBAL FLESH HANGERS (1 AND 3), CANNIBAL FORK (2), FIJIAN POTTERY (4 TO 6), KAVA BOWL AND CUPS (7 AND 8).



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Nose flute (1), neck rests (2-5), wooden dishes (6-7), openwork comb (8), breast-plate, front and rear view (9-10).
SAMPLES OF FUJIAN CRAFTSMANSHIP.

DR. WILLIAM JONES.

IT is our sad duty to record the death of Dr. William Jones, a distinguished ethnologist who for several years was connected with this Museum, but who for some months had been on a collecting expedition for the Field Museum of Natural History, Chicago, among the less civilized tribes of the Philippine Islands. While near Monbato, Luzon, he was attacked by a party of savages on March 28, his thirty-sixth birthday, receiving wounds from which he died on the same day. This is truly a great loss to ethnology, since Dr. Jones was well equipped for work among the Algonkin Indian tribes of North America and had at the time of his death a wealth of unfinished work, most of which is now beyond recovery.

His college career began as a student at Harvard where he received the A. B. degree in 1900. Then he took up the study of anthropology at Columbia University, where he received the degree of Doctor of Philosophy in 1904. He was University Fellow 1900-1902 and Assistant in Anthropology 1902-1903. From 1904-1906 he was a Research Assistant for the Carnegie Institution. While at Columbia University, Dr. Jones made several expeditions for this Museum, returning with collections and data from the Ojibway, Sauk and Fox Indians. These collections are quite complete, those from the various divisions of the Ojibway containing a large series of birch bark charts and song records used in religious societies peculiar to these and related tribes. His chief work, however, was a study of the various Algonkin dialects spoken by the Ojibway, Fox and Kickapoo. Born of a mixed blood Sauk mother and reared by his maternal grandmother, he acquired one Algonkin dialect and gained an insight into Indian life not otherwise easily obtained. His published works include a volume of myths under the title, "Fox Texts," issued by the American Ethnological Society; a general discussion of Ojibway culture, published by the Department of Education, Toronto, Ont.; and "The Algonkin Manitou," in the *Journal of American Folk-Lore*. As these represented but a small part of the data collected by him, now buried in his notes, it is no adequate measure of his work. He had a knowledge and grasp of the ethnological problems centering around the central Algonkin tribes, all his own, and it was his intention after a short journey to the Philippines, again to take up the Algonkin problem as his life work.

Aside from scientific worth and attainments, Dr. Jones had a character and personality that endeared him to many in all walks of life. He was unassuming and modest, yet withal sincere and governed by a high sense of honor and duty. He had a rare sense of balance and proportion that enabled him to meet with sympathy every upright man on his own horizon. Perhaps this is why he had so many friends in such varied walks of life.

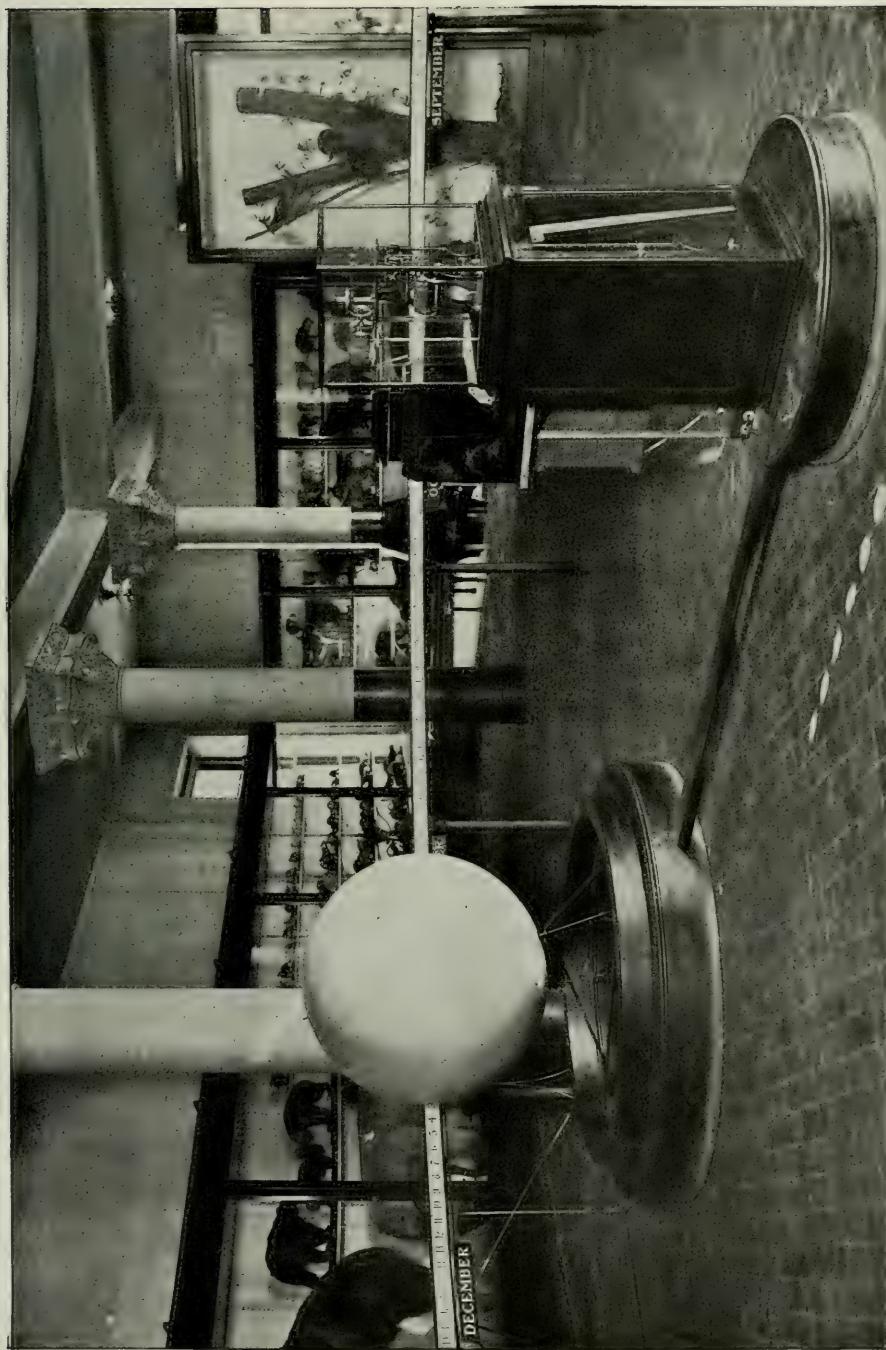
CLARK WISSLER.

THE EARTH AND THE SUN.

AN exhibit making clear the cause of day and night, of the differences of local time and of the succession of the seasons is shown in the accompanying photograph. A four-foot globe, standing for the earth, is regulated to rotate on its axis and to revolve in its orbit around the sun. The circular railing inclosing the exhibit and conspicuously marked with the months and days of the year indicates the orbit; a strong beam from an electric stereopticon represents the light and heat from the sun.

When the visitor approaches this exhibit, he sees no motion except the regular swinging of the pendulum of the clock-work that causes the globe's rotation. A short period of watching, however, convinces him that the globe is moving with the passage of the minutes to bring places most directly in the rays of the sun into the full light of noon time, regions west of these into morning hours, regions east toward the time for the "setting of the sun." The shadow of a line (in front of the lens of the stereopticon) is cast on the globe from pole to pole to mark the noon hour for the different localities, as one after another, from east to west, they reach and pass it; while the time for New York City is recorded continually, as the fifteen-minute sub-divisions on the equator of the globe approach and leave behind this same line shadow.

The location of the earth in its orbit at any day of the year and the inclination of the earth's axis are represented as they occur in the heavens. This exhibit differs from that of the Solar System in the Foyer in that little attention is given to proportional distances and dimensions. It is located, at present, in the Central Hall of the Second Floor, awaiting the construction of a Hall of Cosmology.



MODEL TO DEMONSTRATE THE CAUSE OF DAY AND NIGHT AND THE CHANGE OF SEASONS.

Central Hall, Second Floor. (No. 204.)

THE PHILIPPINE EXHIBITION.

THE Philippine Hall is dismantled and the Philippine Exhibit prepared at the request of the United States War Department, has disappeared from the Museum to reappear in Seattle on the opening day of the Alaska-Yukon-Pacific Exposition. There, given the same form that it had here, the same unity of idea, the same harmony of color and decorative effects, it will remain in the Philippine Building of the Exposition from June 1 until October 16, after which it will return to be given permanent installation in the Museum.

It is but little more than ten years ago that the Filipinos were in insurrection against Spanish rule. They had known nothing of freedom for nearly four hundred years, while this period of paternal government had civilized them and made them feel equipped for freedom. Not only had they no voice in the government, they had practically as little control over Philippine trade. Their tobacco industry was a State monopoly; their foreign commerce catered to Spanish interests and the merchants of Seville. As to education, there was but one teacher to every four thousand of population. The Filipinos had not even a medium of communication with Spanish authority, for the agents of the church in whose hands rested the management of schools, had kept the Spanish language out of the curriculum in order to retain their power as intermediaries between the people and the government.

Then came American occupation in December, 1898; and, despite the best efforts of the American government, the story of the Filipinos in the years immediately following remained in many respects a sorry one. With lack of understanding of English, with no knowledge of America as a conquering nation, it was difficult indeed for even the most enlightened of the tribes to look upon the American military governor and the American army as friends instead of enemies. Guerilla warfare was added to the ravages of the previous war and continued until 1902. Rice fields were left to cogon grass and weeds; robber bands multiplied. In addition, typhoons damaged the hemp plantations; the locust plague destroyed crops; a "rinderpest" killed off the draft cattle; while cholera and various tropical diseases brought dread results to the Filipinos themselves.

Slowly out of the blackness of these years came trust in the American government and a radical change in conditions. Children and teachers



GENERAL VIEW OF THE PHILIPPINE EXHIBIT.

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Set up at the Museum, then packed and shipped to the Alaska-Yukon-Pacific Exposition. Note series of transparencies surrounding the hall above the cases (showing at right in photograph).



IGOROT GROUP.

alike were glad to be taught English by the soldiers, who entered the schools at once and carried on the work until the arrival of one thousand teachers from the United States in 1900. The Filipinos also found themselves in possession of a share in the government, not only in the cities and provinces where two-thirds of the officials were elected by the people's vote, but also in the central government, three Filipinos and four Americans comprising the Philippine Commission. They gained practical ideas at the government experimental farms where they flocked in hundreds to see modern machinery and methods applied to the growing of Philippine crops. Each man learned that he could cut lumber free of charge from the public forests to build a substantial house and a boat. Many hundreds of Filipinos gained work and good wages in the construction of the new roads and railroads. Many an inland farmer found routes opened by which he could market his produce. The lepers and their friends realized that the homes provided at the Culion Island Leper Colony were better than any they had ever known. Prisoners from Manila appreciated the fact that they were made "colonists" on parole at Iwahig, with opportunity to work in the fields and earn the privilege of being joined by their families.

When these facts are borne in mind, the Philippine Exhibit assumes new interest. It shows not only what the Filipinos were, and what Philippine agriculture and commerce were, under Spanish rule, but also what they are under American influence. It proclaims emphatically that progress has been the keynote of life in the Philippines in these ten years, despite calamities, and it suggests that in the future the prosperity of the Philippine people is to be limited only by the great productive capacity of the islands.

The first section of the exhibit shows Negrito and Igorot huts with accompanying life-size figures represented in the work of making fire, carrying baskets of food, cleaning rice and weaving. The second section leads from these most primitive tribes through the Moro and other lesser tribes to the Tagalog and Visayan groups, the most highly civilized of the Malayan Christian Filipinos. The cases are filled with metal work, with pottery and basketry and with beautiful cloths woven from hemp, pineapple fibre and silk; the pillars carry weapons of many kinds, fishing and hunting outfits, busts of natives, and relief maps showing the localities occupied in the islands by each tribe.

Continually, however, the attention of the visitor is caught by the

colored transparencies that surround the entire hall in a bamboo trellis above the cases and some distance from the walls. The method here used of closely incorporating transparencies with the material part of an exhibit is an innovation in museum installation and a most effective one, not only for the accurate telling of facts but in general artistic result as well. In perhaps no other way could the Filipino people and their activities have been made so vivid; but the pictures do more than bring the people definitely before the eye, they give to a certain extent the atmosphere of the islands; they show the beauty of Philippine forests and rivers, the picturesqueness of the rice terraces that cover the mountain slopes, the difficulties of the mountain trails, and the sweep of typhoons over palms and sea.

There are many other decorative effects which also tend to give unity and meaning to the exhibition. Fish nets and hemp fibre connect the pillars to shut off a middle aisle, an open space except for seats constructed of Philippine woods and bamboo and of the stocks formerly in use in the market places of Manila. At the center of the hall a rotunda is made of large Philippine palm trunks around which are stacked Filipino guns, surrendered during that six months after President McKinley's reelection in 1900 when more men gave up their guns in the islands than during any similar period in the history of war. Swung conspicuously in the center of this rotunda is one of the most charming features of the exhibit, a strange outrigger boat so typical of the small craft in the far east, containing a Moro youth, paddle in hand.

The third and fourth sections of the exhibit illustrate the Philippines under American influence, the former covering agricultural and commercial life, the latter, educational and political. Here it is that such significant facts as the following are concretely set forth:

Philippine coal promises to be sufficient in the future for the needs of the islands.

Philippine forests contain 665 kinds of trees and cover 48,112,920 acres. This fact is emphasized by a wainscoting of Philippine woods surrounding the entire exhibition hall, representing the largest and most authoritative collection in the world.

There were 428 miles of standard gauge railroad in operation at the close of 1908, and four years more will give the islands a total of 1000 miles, whereas only about 120 miles of narrow gauge track existed at the close of Spanish rule.

Under the Americans 3506 primary schools have been opened, which number added to the 726 existing in Spanish times gives a total of 4,232 at present in the islands.

The cultivation of rice has latterly increased to such an extent that in 1907 there had to be brought into the islands from foreign countries only about one-third of the amount imported in 1903.

The Philippines are a commercial center for half the population of the globe. The total amount of produce sent out from the islands in 1907 was \$33,097,867, and the total amount imported was \$30,453,810, as compared respectively with \$14,846,582 and \$19,192,986 in 1899.

The most important fact developed in the Philippine Exhibit, outside of the increased prosperity of the islands, is that under American influence the Filipinos are eagerly taking the steps offered toward self-government and self support: that there is administration of justice in the islands and the people are engaged in peaceful pursuits, that the United States is not expending any money to assist the Philippine government or the Filipinos except in so far as the appropriations for Army and Navy are in part expended in the islands.

One other fact, however, is certain to stand out clearly before every thinking visitor to the Philippine Building at Seattle, which is, that the American record in the Philippines is one of which the world will be proud, when this record takes its place in the history of nations.

MUSEUM NEWS NOTES.

SINCE the last issue of the JOURNAL the following persons have been elected members of the Museum: Life Members, MESSRS. FREDERICK T. VAN BEUREN, KARL HUTTER, NATHANIEL T. KIDDER, CHARLES B. PENROSE and GEORGE D. PRATT; MMES. OLIVER G. JENNINGS, JOHN INNES KANE and SAMUEL LAWRENCE, and MISSES P. C. SWORDS and ANNE THOMSON; Annual Members, MESSRS. J. R. BRADLEY, CHAS. W. BURROUGHS, LOUIS C. CLARK, WM. CRAWFORD, ROBT. H. ENGLE, HENRY P. FAIRBANKS, GEORGE R. FEARING, HARRY L. FERGUSON, ARNOLD HAGUE, H. H. HOLLISTER, MARC KLAU, ALFRED G. MAYER, HENRY METCALFE, CASIMIR DE R. MOORE, WILLIAM E. NICHOLS, GEORGE E. POLLOCK, THOMAS R. PROCTOR, H. CASIMIR DE RHAM, A. W. ROSSITER, THOS. ROWLAND, CHARLES W. SABIN, HENRY

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PRESIDENT OSBORN has recently been elected one of the twenty-five foreign members of the Zoölogical Society of London and an Honorary Member of the Royal Academy of Sweden.

PROFESSOR H. E. CRAMPTON, Curator of Invertebrate Zoölogy leaves New York early in May for an absence of eight months on an expedition to the South Seas for the purpose of continuing his important studies on the variation and distribution of terrestrial snails, a work which he began in 1906 for this Museum and continued in 1907 and 1908 under a grant from the Carnegie Institution. Professor Crampton will devote most of his time to the Society Islands, the Cook Islands, the North Island of New Zealand, Samoa and Hawaii.

A RECENT letter from Mr. William B. Richardson, collecting for the Museum in Nicaragua, announces the shipment of a large collection of birds and mammals made during the last six months at points ranging in altitudes from 700 to 5,000 feet. Among the mammals are many species not included in his previous shipments.

DR. ALEXANDER PETRUNKEVITCH, Honorary Curator of Arachnida, will spend July and August collecting arachnida and other forms of insect life in Texas, Mexico and Guatemala.

PUBLIC meetings of the New York Academy of Sciences and its Affiliated Societies will be held at the Museum as usual during May.

The American Museum Journal

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Prof. WILLIAM MORTON WHEELER, Ph.D., Honorary Curator of Social Insects.
ALEXANDER PETRUNKEVITCH, Ph.D., Honorary Curator of Arachnida.
Prof. AARON L. TREADWELL, B.S., M.S., Ph.D., Honorary Curator of Annulates.

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DEPARTMENT OF MAPS AND CHARTS.

A. WOODWARD, Ph.D., Curator.

THE AMERICAN MUSEUM
OF
NATURAL HISTORY

FOR THE PEOPLE
FOR EDUCATION
FOR SCIENCE

HUDSON-FULTON CELEBRATION NUMBER

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THE AMERICAN MUSEUM OF NATURAL HISTORY was established in 1869 to promote the Natural Sciences and to diffuse a general knowledge of them among the people, and it is in cordial coöperation with all similar institutions throughout the world. The Museum authorities are dependent upon private subscriptions and the dues from members for procuring needed additions to the collections and for carrying on explorations in America and other parts of the world.

The membership fees are,

Annual Members.....	\$ 10	Fellows.....	\$ 500
Sustaining Members (Annual) .	25	Patrons.....	1000
Life Members.....	100	Benefactors (Gift or bequest) .	50,000

All money received from membership fees is used for increasing the collections and for developing the educational work of the Museum.

The Museum is open free to the public on every day in the year

* Deceased.

The American Museum Journal

VOL. IX

OCTOBER, 1909

No. 6

THE ENRICHMENT OF OUR COLLECTIONS FROM ARCTIC AMERICA.

OUR members will be interested in the following telegrams which were exchanged immediately upon Commander Robert E. Peary's getting in touch again with the civilized world.

Indian Harbor via Cape Ray, N. F.
September 6, 1909.

AMERICAN MUSEUM OF NATURAL HISTORY, 77th Street
and Central Park West, New York City.

The Pole is ours. Am bringing large amount material for Museum.
PEARY.

New York City, September 7, 1909.

Commander ROBERT E. PEARY,
Steamer "Roosevelt,"
Sydney, Cape Breton, N. S.

American Museum profoundly moved. Am delighted with your triumph at last. Mrs. Jesup joins me in congratulations. Your flag and route posted on our polar map this morning.

OSBORN.

At the time that this number of the Journal goes to press the eminent explorer has not yet arrived in New York, and the material which is awaited with so much interest is still on its way to the city. Our late president, Mr. Jesup, was deeply interested in Mr. Peary's success, being an original member of the Peary Arctic Club and a generous contributor toward its objects. Largely through Mr. Jesup's interest and influence Mr. Peary and the Peary Arctic Club have provided the Museum from previous expeditions with much ethnological material illustrating the Eskimo of the Smith Sound region, including summer and winter clothing for men, women and children, personal ornaments, carvings, games and toys, lamps and other household utensils and furniture, sledges,

dogs and harness, bow drills for making fire and for boring, knives and other tools, bows and arrows and guns of European manufacture but native repair, kyaks or boats, together with drags, floats, harpoons, lances, spears and fishing lines. Some of this material together with a great floor map showing routes has been placed on exhibition on the ground floor of the new west wing. In the line of zoölogy, among other things Mr. Peary has brought back to the Museum important series of mammals, particularly musk oxen and caribou. The most valuable single specimens resulting from the Peary expeditions are the three iron meteorites from Cape York which were brought from the Arctic regions in 1897 and are now on exhibition in the Foyer. The largest of these weighs $36\frac{1}{2}$ tons and is known as "Ahnighito," the others are "The Woman" (6,000 pounds) and "The Dog" (897 pounds).

MUSEUM NEWS NOTES.

ON account of the part that the Museum is taking in the Hudson-Fulton Celebration, the current number of the *JOURNAL* is devoted to the special Guide Leaflet which has been prepared to accompany the exhibition pertaining to the Indians of Manhattan Island and vicinity installed at the west end of the Hall of the Plains Indians (No. 102 of the ground floor). This exhibition is permanent in character and is further illustrated by the volume on the Indians of New York State which has been prepared under Dr. Clark Wissler, Curator of Anthropology, as editor and issued by the Museum in its series of "Anthropological Papers." The Guide Leaflet in separate form may be obtained at the entrance to the Museum or on application to the librarian, and copies of the larger work may be obtained from the librarian.

THE cetacean gallery on the third floor of the East Wing (Hall No. 306) was opened again to the public early in September, after being closed for some months on account of changes which were in progress. A broad frieze representing the ocean now extends around the room and forms an appropriate background for the marine mammals which are its chief exhibits. At the west end of the hall is a series of models representing a school of dolphins at play in the water, while at the east end of

the hall a school of porpoises is similarly installed. The models were prepared at the Museum from casts, drawings and photographs of actual specimens, and the frieze was painted by Mr. Albert Operi.

PRESIDENT OSBORN attended the Darwin Memorial exercises at Christ College, Cambridge, during the latter part of June and was the spokesman of the scientists and scientific institutions of America in giving to the University of Cambridge a replica of the Couper bust of Darwin that was donated to the Museum last February by the New York Academy of Sciences.

THE series of paintings illustrating the North Polar regions which has been made by the artist, Mr. F. A. Stokes, has been completed and forms the background of the entire Eskimo exhibit at the northern end of the north hall of the ground floor. These paintings will be made the subject of a special illustrated article in an early number of the JOURNAL.

PROFESSOR BASHFORD DEAN, Curator of Ichthyology and Herpetology, spent the months of June and July in Europe, where he visited the museums of Paris and London. Professor Dean has recently been made a Correspondent of the Natural History Museum of Paris.

A RESTORATION of the jaws of the great shark *Carcharodon angustidens* which inhabited the waters of the American Atlantic Ocean during Eocene Tertiary time has been prepared under the direction of Professor Dean and mounted at the entrance to the fossil fish alcove at the south-east corner of the fourth floor. This restoration, which is 8 feet, 10 inches across and has a spread of 5 feet, 8 inches, gives one a striking idea of the enormous size and fierce aspect which these ancient sharks must have possessed.

MR. R. C. ANDREWS of the Department of Mammalogy left New York on August 25 for Manila to join the U. S. Fish Commission ship "Albatross" for a cruise of eight or ten months in the Pacific Ocean, particularly among the islands along the western border from Borneo to central Japan. Mr. Andrews goes under an appointment by the U. S. Fish Commission.

PROFESSOR HENRY E. CRAMPTON, Curator of Invertebrate Zoölogy,

who is continuing his extensive studies on the variation and distribution of terrestrial snails in the islands of the south Pacific is now in Samoa, after spending ten weeks in the Society Islands and about a month in New Zealand. Under date of July 18 he wrote from Tahiti saying that the survey of the islands of Tahiti and Moorea had then been completed with gratifying results, since several new varietal forms had been discovered, connecting types and localities previously unrelated. The ethnological results of the expedition were satisfactory also, on account of friendly reception from the old chiefs of the native tribes and through the occurrence of a great annual feast that brought together many groups of people from different districts.

DURING the summer word came from Mr. V. Stefánsson under date of February 8 giving a brief résumé of his trip westward from Flaxman Island along the coast to Wainwright Inlet, which is a week's journey, say about one hundred miles, southwest of Point Barrow and back again to Cape Smythe near Point Barrow, where he spent a large part of the winter, while the sun was below the horizon. Not much can be done during the dark days of winter, but Mr. Stefánsson improved the time at Cape Smythe, where he was the guest of Mr. Charles Brower, Director of the Cape Smythe Whaling and Trading Company's station, by making physical measurements of the Point Barrow Eskimo, compiling notes on their dialect and transcribing their folk-lore tales, in all of which much valuable assistance was received from Rev. H. R. Marsh, M. D., Presbyterian missionary and physician of the U. S. Bureau of Education, and Mr. C. W. Hawksworth, the resident school master. At the time of writing, Mr. Stefánsson was planning to leave Point Barrow the latter part of February to go eastward to Cape Bathurst and beyond and was expecting to send a report from MacPherson near the mouth of the Mackenzie about the middle of July.

MESSRS. HERBERT LANG and JAMES CHAPIN of the Department of Mammalogy sailed from New York May 8 for Antwerp, whence they proceeded on June 3 for the upper Congo district for the purpose of making a zoölogical survey of the basin of the Congo for the benefit of this Museum. The Belgian authorities have provided every facility possible for the assistance of the expedition in attaining its objects and Messrs. Lang and Chapin with their outfit reached Matadi in the Belgian

Congo on June 24. They are now at or in the vicinity of Stanleyville in the highlands of the upper part of the river. This place is healthful and will be made the headquarters from which to set out on periodical excursions into the surrounding country, until the purposes of the expedition have been accomplished. Mr. Lang reports that there is a poverty of desirable animal life, particularly birds, in the vicinity of Boma and Matadi, the region being one of barren hills. The Stanleyville region, however, abounds in game, and the necessary permission has been secured for collecting all forms of animal life, including the right to capture two specimens of the rare okapi, which seems to be a member of the giraffe family. King Leopold has previously shown his interest in the Museum by the donation of a large collection illustrating the Congo peoples; and now the Belgian government, in addition to the unusual privileges granted, has contributed largely toward defraying the expenses of the present expedition.

Mr. C. E. AKELEY, the noted collector of African big game, left New York August 17 for British East Africa, where he will continue studies begun during former expeditions and will make collections for the American Museum. The expedition will require two years, and, besides obtaining a group of elephants to be mounted here amid a reproduction of their natural habitat, will devote much time to making a complete photographic record of the people, fauna and flora. A moving picture camera has been taken for the purpose of getting pictures of army ants on the march and other movements of animals.

THREE important additions have been made to the collection of meteorites in the Foyer: the 682-pound iron to be known as Guffey, but as yet undescribed, the section of Gibeon (West Africa) which was secured by the Museum last year, as noted in the JOURNAL for April, 1908, and a 20-pound mass of the aërelite "Modoc," which is the largest piece of this fall that has been found and was acquired by the Museum in January of this year.

THE upright cases in the gallery of the East Wing (third floor, No. 306) are in process of rearrangement to illustrate in diagrammatic fashion evolution among living mammals and relationship with fossil forms. This is done by means of wedge-shaped cores within the cases around

the bottom of which horizontal bands of color represent Cretaceous and the great subdivisions of Tertiary time, the space above the bands being devoted to the installation of mounted specimens illustrating the principal subdivisions of mammals. Converging lines extend downward, meeting in the band standing for the geological period in which the zoölogical group is known or supposed to have originated. Many difficulties surround this effort at graphically representing a natural classification, hence the present scheme can only be regarded as an experiment subject to modification.

AT the May meeting of the Board of Trustees two classes of membership were added to the Museum. Benefactors are persons contributing or bequeathing \$50,000 in cash or securities, and Sustaining Members are those who contribute \$25 annually to the funds of the institution.

SINCE our last issue the following persons have been elected to membership in the Museum: PATRON, MRS. ANDREW CARNEGIE; Fellows, MRS. HENRY O. HAVEMEYER, and MISSES CAROLINE PHELPS STOKES and OLIVIA E. PHELPS STOKES; Honorary Fellow, BARON LUDOVIC MONCHEUR; Life Members, DOCTORS JOHN HENDLEY BARNHART and CARROLL DUNHAM, MESSRS. WILLIAM G. DE WITT, DANIEL B. FEARING, J. HORACE HARDING, FREDERICK DELANO HITCH and ROBERT S. WOODWARD and MRS. EDWARD S. HARKNESS; Sustaining Members, MMES. CLARENCE H. MACKAY and M. ORME WILSON; Annual Members, MESSRS. GEORGE J. BASCOM, NATHAN D. BILL, CLIFFORD V. BROKAW, FRANKLIN Q. BROWN, GEORGE S. CLAPP, CLARENCE M. CLARK, G. D. COCHRAN, J. CLARENCE DAVIES, DANIEL EDGAR, JOHN W. EDMONDS, L. C. HANNA, GEO. L. INGRAHAM, WILLIAM H. KELLY, DAVID KEPPEL, LEROY MCKIM, EDWIN O. MEYER, ROBERT B. MEYER, A. PAGENSTECHER, CHAS. W. PARSONS, G. RAMSPERGER, J. G. TIMOLAT, JOHN R. TOTTEN, ELMER R. VACTOR and W. A. WHITE, GEN. ALEXANDER SHALER, REV. J. L. ZABRISKIE, A. ALEXANDER SMITH, M. D., MMES. JOSEPH S. AUERBACH, ELI BERNHEIM, URBAN H. BROUGHTON, EDWIN M. BULKLEY, DANIEL C. FRENCH, WILLIAM E. ISELIN, WILLIAM M. KINGSLAND, ANGELINE J. KRECH, S. NEUSTADT, MARION STORY, ROBERT E. WESTCOTT, RICHARD H. WILLIAMS and FRANCIS DANA WINSLOW and MISSES CAROLINE HARRIOT, IRENE LEWISOHN, FAITH MOORE, MARION MOTT, GLADYS F. WATERBURY, L. WHEELER and DOROTHY P. WHITNEY.

LECTURE ANNOUNCEMENTS.

MEMBERS' COURSE.

The first course of lectures for the season 1909-1910 to Members of the Museum and persons holding complimentary tickets given them by Members will be given in November and December.

PUPILS' COURSE.

The lectures to Public School children will be resumed in October.

PEOPLE'S COURSE.

Given in coöperation with the City Department of Education.

Tuesday evenings at 8:15 o'clock. Doors open at 7:30.

October 5.—MR. CHARLES S. BULLOCK, "Uncle Sam's Farm." Illustrated by stereopticon views.

October 12.—MR. EDWARD RUSSELL PERRY, "The Pacific Northwest." Illustrated by stereopticon views.

October 19.—MR. HOMER C. BRISTOL, "Northern California." Illustrated by stereopticon views.

October 26.—MR. HOMER C. BRISTOL, "Southern California." Illustrated by stereopticon views.

Saturday evenings at 8:15 o'clock. Doors open at 7:30.

DR. WILLIAM L. ESTABROOK, of the College of the City of New York,—the first of a course of eleven illustrated lectures on inorganic chemistry.

October 9.—"Physical and Chemical Change."

October 16.—"Oxygen and Ozone."

October 23.—"Hydrogen and Hydrogen Peroxide."

October 30.—"Water."

Children are not admitted to these lectures, except on presentation of a Museum Member's Card.

MEETINGS OF SOCIETIES.

Public meetings of the New York Academy of Sciences and Affiliated Societies are held at the Museum according to the following schedule:

On Monday evenings, The New York Academy of Sciences:

First Mondays, Section of Geology and Mineralogy;

Second Mondays, Section of Biology;

Third Mondays, Section of Astronomy, Physics and Chemistry;

Fourth Mondays, Section of Anthropology and Psychology.

On Tuesday evenings, as announced:

The Linnaean Society of New York;

The New York Entomological Society;

The Torrey Botanical Club.

On Wednesdays, as announced:

The Horticultural Society of New York;

The New York Mineralogical Club.

On Friday evenings, as announced:

The New York Microscopical Society.

The programmes of the meetings of the respective organizations are published in the weekly *Bulletin* of the New York Academy of Sciences and sent to the members of the several societies. Members of the Museum on making request of the Director will be provided with the *Bulletin* as issued.



The Indians of Manhattan Island and Vicinity

**A GUIDE TO THE
HUDSON-FULTON EXHIBIT**

**AT THE
AMERICAN MUSEUM OF NATURAL HISTORY**

No. 29 of the Museum Guide Leaflet Series.

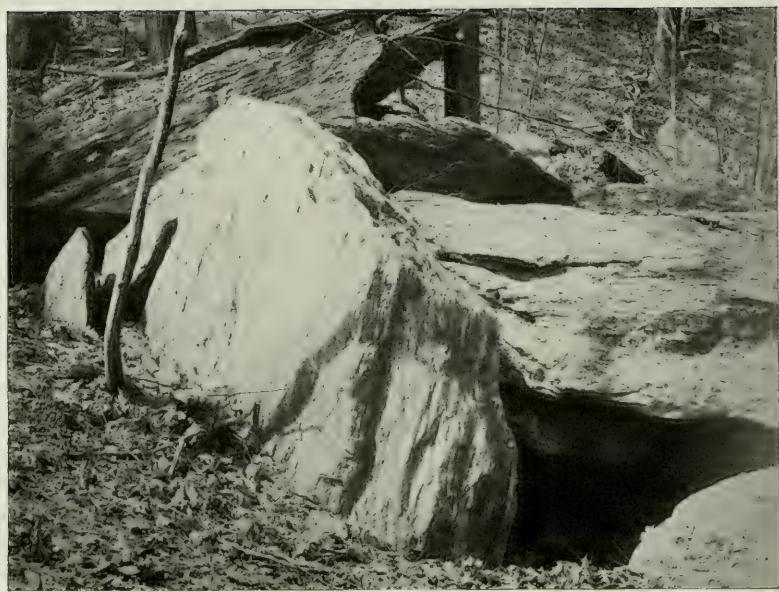


FIG. 1. INWOOD ROCK-SHELTER, MANHATTAN.

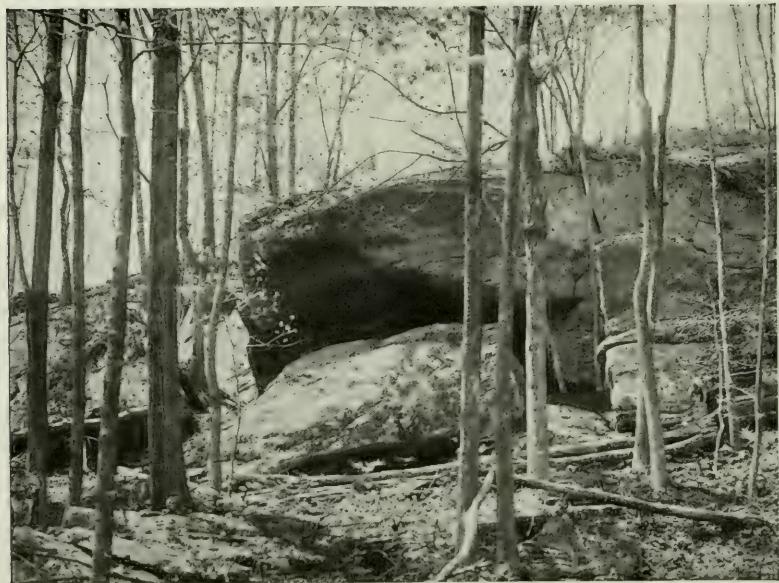


FIG. 2. FINCH'S ROCK HOUSE

THE INDIANS OF MANHATTAN ISLAND AND VICINITY.

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Introduction.

AS a part of the Hudson-Fulton celebration, a special exhibit representing the Indians of New York has been arranged in the West Hall, on the ground floor of the Museum. The low, or table cases, contain implements of stone, bone, shell and other materials, found on Manhattan Island and in and around Greater New York,— implements once used by the Indians occupying this region. In the upright cases will be found ethnological objects, many of which are still in use among the surviving Iroquois Indians of New York State. This guide, therefore, refers chiefly to the remains of Indians found upon Manhattan Island and adjacent shores, examples of which are shown in the table cases. The location of the various cases may be seen from the accompanying plan.

In using this guide, the visitor is advised to turn north, as he enters the exhibit and take a general view of the cases in the order designated; then it is suggested that he follow the discussion (pp. 14-36) of the various kinds of specimens found near New York City as he makes a second examination of the exhibits in the table cases.

The Hudson-Fulton exhibition is designed to show the life of the Indians of New York City and vicinity in prehistoric times, when primitive conditions were as yet unchanged by the advent of European settlers. The objects shown have been collected by Museum expeditions sent for the purpose of excavating the ancient village, camp and burial sites of the Indians in several localities within the area indicated, and the exhibits have been prepared from the remains thus secured. The remnants of the tribes that once occupied the primeval forests of Greater New York have so long been scattered and lost that almost nothing can be obtained from them now.

Beginning with the northern half of the exhibit, the visitor will find the first section of the upright case (1)¹ devoted to a few specimens showing some of the more perishable articles formerly in use among the Delaware and Mohegan Indians of this immediate vicinity. Most of these have been collected from the scattered remnants of these people, or else were obtained from old families who, since the disappearance of the natives, preserved

¹ See diagram on page 193.

articles of Indian manufacture in their homes as curiosities. The other portions of this case exhibit the clothing and weapons of the Iroquois.

The first table section (2A) is devoted to an exhibition, as comprehensive as possible, showing the life of the natives in prehistoric times by means of specimens obtained from the ancient village and camp sites. Here may be seen bones of the various animals, fish and shell-fish upon which the Indians depended for subsistence; fragments of nuts, corn, roots and other food products preserved by charring and obtained from ancient fireplaces, and such implements as arrow points of antler and stone, net-sinkers of stone and stone hoes for tilling the fields — all illustrative of primitive methods of hunting and agriculture. Implements exhibited in the same case show the preparation of animal and vegetable food with primitive utensils, while close by are tools used by the Indians in preparing skins. The manufactures of the Indians are illustrated in the immediately adjacent section (2B). A progressive series of implements shows the making of an arrow point from a simple quartz pebble such as might be picked up anywhere on the shore, with the various stages leading to the finished point; the tools employed are also exhibited. Implements of stone for pecking, grooving and polishing; hatchets and axes; pottery fragments, and household utensils, such as hammers, axes, adzes and gouges, will be found at hand.

In the other side of this table case (2B) there is an exhibit from Manhattan Island, made up of specimens principally collected by Mr. Alexander C. Chenoweth in the rock-shelters and village sites at Inwood, showing as fully as possible the life of the prehistoric Manhattan Indians. The exhibit illustrating, by means of models, the manufacture of pottery is especially noteworthy. From the appearance of fragments now to be found on the sites of the ancient Indian villages of this vicinity and the methods of modern Indian pottery makers, we may safely conclude that most, if not all, of the earthenware manufactured in this locality was made by the "coil" process, which consisted of the following steps. The Indians first secured clay of a suitable quality, which was mixed with pounded shell or stones to make it tougher and more durable. It was then worked into long rolls, and the Indian, beginning at the bottom, worked the pot up by adding coil after coil, blending or smoothing the coils with a smooth stone until they did not show from either the interior or exterior surface. The potter's wheel was not known to the aborigines in the olden days. When the pot was completed, it was decorated by stamping or incising designs about the exterior of the rim.

In the next table case (3A) are to be seen implements and remains from the shell heaps marking the long-forgotten Indian villages at Shinnecock Hills, Long Island. This exhibit, which is one of the most complete of its kind, gives a rather adequate picture of the ancient life of these people

and is especially valuable for the number and variety of primitive manufactures shown. One of the most interesting of the sections demonstrates, by means of a series of specimens, the primitive methods of cutting bone and antler employed by these Indians. Bone was cut by notching or grooving it with a stone knife or flake and then breaking it at the groove. Antler was worked in the same way, but it is very probable that the Indians boiled antler in order to make it more pliable and easily cut.

In the western side of this case (3B) there is a series of specimens collected from an ancient Indian village situated on the site of the Parade Ground at Van Cortlandt Park. In the adjacent section some specimens from Long Island in general are shown.

The upright case (4A) at the end contains an exhibit from the Iroquois Indians of New York State, and the small wall case (6) on the side shows a section of a shell heap with a map showing the location of most of the

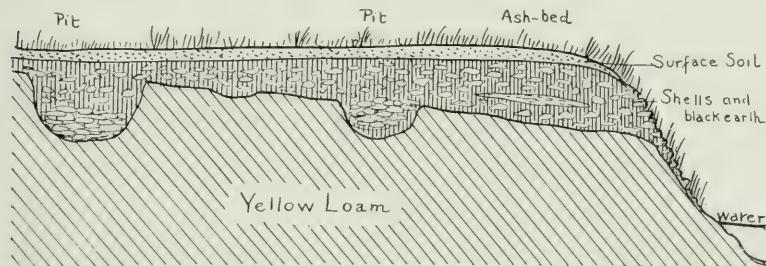


FIG. 3. DIAGRAM OF A TYPICAL SHELL DEPOSIT.

Indian villages of Greater New York and vicinity, as well as photographs and labels describing the opening and excavation of the sites. Specimens typical of those found in the shell heaps are also exhibited.

Of all the traces left by the aborigines along the New York seacoast, the most abundant and familiar are the shell heaps — the beds of refuse marking the sites of ancient villages, camps and isolated wigwams. Wher- ever the fresh water joins the salt and especially where open water for fishing, a creek with its clam beds and a spring for drinking come together in happy combination, there is generally to be found some such evidence of Indian occupation, unless, as is often the case, settlement and improvement have buried deep the shells or carted them away.

The typical "shell heap" is not a heap at all, for leaf mold, the wash from neighboring high ground and often cultivation have made it level with its surroundings (Fig. 3). Very often, unless the land be plowed, no shells whatever show on the surface, and the only way of finding out the conditions

of things below the sod is to test with a spade or a crowbar. If shells are present, their crunching soon gives notice of the fact. Sometimes shell heaps have been located by shells thrown from mole and woodchuck burrows, or by outcropping in gullies washed by the rain, or banks broken down by the surf. They are generally located near some creek or bay on low but dry ground, preferably with an eastern or southern exposure, and, as before mentioned, not far from drinking water. Some have been found fronting on the open Sound, but such cases are rare. These deposits consist of large quantities of decayed oyster, clam and other marine shells mixed with stained earth, with here and there ashes, charcoal and fire-broken stones to mark the spots where ancient camp fires blazed. Among

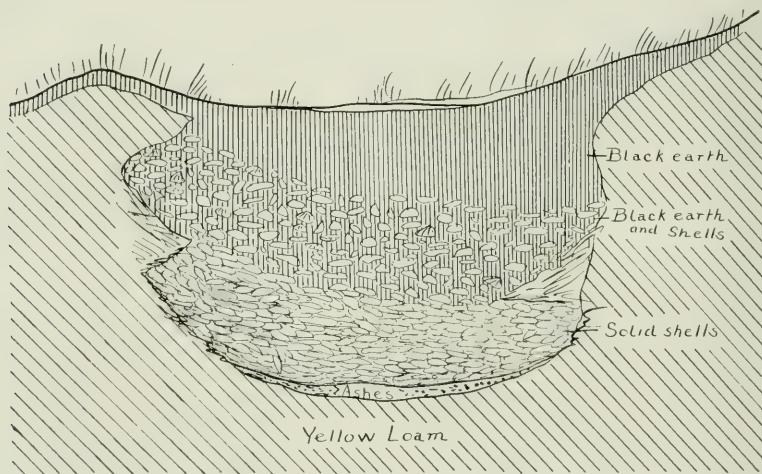


FIG. 4. CROSS SECTION OF A SHELL PIT.

the shells are usually scattered antlers of deer, fish bones, bones of animals and birds split for the marrow, quantities of pottery fragments, and broken implements, in short, the imperishable part of the camp refuse left by the Indians. Now and then, perfect implements and ornaments that had been carelessly lost in the rubbish or hidden for safe-keeping are discovered. Little did the Indian think, as he laid away his little hoard, that his handiwork would never see light again until he and his people had long been gone and forgotten.

Shell heaps vary from a few inches to four feet in depth, and in area from a few square yards to several acres — all depending on the length of time the settlement was occupied and the number of dwellings comprising it. Deep shell heaps are often divided into layers, the lowest of which are, of

course, the oldest. Under and near most of these deposits may be found scattered "pits" or fire holes, which are bowl-shaped depressions in the ground filled with layers of stained earth, shells and other refuse, with an occasional layer of ashes. Some pits are as large as ten feet wide by six feet deep, but the average is four feet deep by three feet wide. It is supposed that they were used as ovens or steaming holes and afterwards filled up with refuse (Fig. 4). Some contain human skeletons, which may have been interred in them during the winter season when grave digging was impossi-



FIG. 5. MAP GIVING THE LOCATIONS OF SHELL DEPOSITS

Those marked + have been explored by the Museum.

ble. Pits as a rule, contain more of interest than the ordinary shell layer. The closely packed regular masses of shells form a covering which tends to preserve bone implements, charred corn and such perishable articles from decay in a way that the looser shells of the general layers fail to do.

Shell heaps, while abundant along the seacoast, are seldom found inland, except on salt creeks or other streams having access to salt water. They may be seen all along the east shore of the Hudson River at more or less

frequent intervals up as far as Peekskill, and on Croton Point and between Nyack and Hook Mountain on the west shore they attain considerable size. There are a few small deposits, however, composed mainly of brook clams (*Unio*) situated on fresh water lakes in the interior of Westchester County. There are many shell heaps on Staten Island. Shell heaps occur or did occur on Constable Hook, New Jersey, and at intervals between there and Jersey City along the western shore of New York Bay. The accompanying map (Fig. 5) gives the location of the important known shell deposits of the vicinity of New York City.

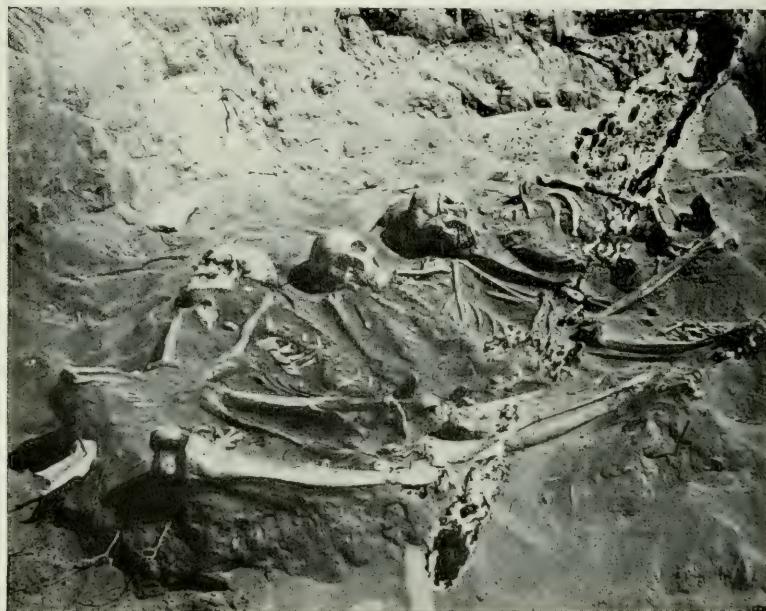


FIG. 6. GRAVE OF SKELETONS WITH ARROW POINTS.

On the opposite side (4B) of the upright case, the Iroquois exhibition is continued, but the last section is devoted to a small exhibit showing the manufacture of wampum by the Indians of Long Island with prehistoric implements and a number of specimens of wampum belts and strings collected from the Iroquois of New York and Canada.

The wall case (5) at the western end of the room contains a group illustrating the costumes of the Iroquois Indians of a period from about 1790 to the present day.

Beginning on the south side of the aisle, the easternmost upright case

(7) is devoted to the False Face Society of the Iroquois, while the table case (8A) immediately following contains objects from Westchester County and Staten Island. In these sections an interesting feature of aboriginal life is shown. Although most of the Indians of the vicinity of Greater New York did not place objects in the graves with their dead, some graves at Burial Ridge, Tottenville, Staten Island, when opened for the Museum in 1895, were found to contain a great many interesting and valuable remains. With the skeleton of a child there was a great deposit of utensils, both finished and unfinished ornaments, such as beads, pendants, and the like, a stone pipe and a number of other objects, while not far away the skeletons of three Indian warriors were exhumed (Fig. 6), in and among whose bones there were found, as shown in this section, twenty-three arrow points of stone, antler and bone (Fig. 7).

This is an excellent exhibit indicating the use of the bow in Indian warfare. The skeletons lay side by side with the legs flexed as shown in the illustration (Fig. 6). In the first skeleton, it was found that two points of antler and one of bone had pierced the body and lodged near the spinal column. Another point of argillite had been driven between two ribs, forming a notch in each. A bone arrow point had struck the shoulder and was resting against the scapula. Among the bones of the right hand, an arrow point of antler was discovered, and there was a similar one near the left hand. Another antler point was lying in the sand just beneath the body and had, no doubt, dropped from it when the flesh wasted away. The most interesting wound of all was one where an antler-tipped arrow had ploughed through one side of the body and fully one-third of the point had passed through one of the ribs, making a hole, where it remained, as smoothly as if drilled. The second body was also terribly injured. The left femur showed an elongated puncture near the lower end, probably made by an arrow point. Among the ribs was the tip of an antler point, and a yellow jasper one was among the ribs on the left side of the body. Three other points were among the bones. The third skeleton was likewise an example of old-time bow play. There was an antler point among the ribs on the left side. The end of one of the fibulae was shattered by a stone arrow point, and a second point had lodged between two ribs. Beneath the sternum was a flint point, and the right shoulder blade showed a fracture near the end, caused by a blow of some hand implement or an arrow. Near the base of the skull, the end of an antler arrow point was discovered, broken perhaps by its impact with the occiput. Two bone points were near the lower bones of the left leg. A second point was found upon search among the left ribs; under the vertebræ was the base of another antler point, and two broken points were found beneath the body.

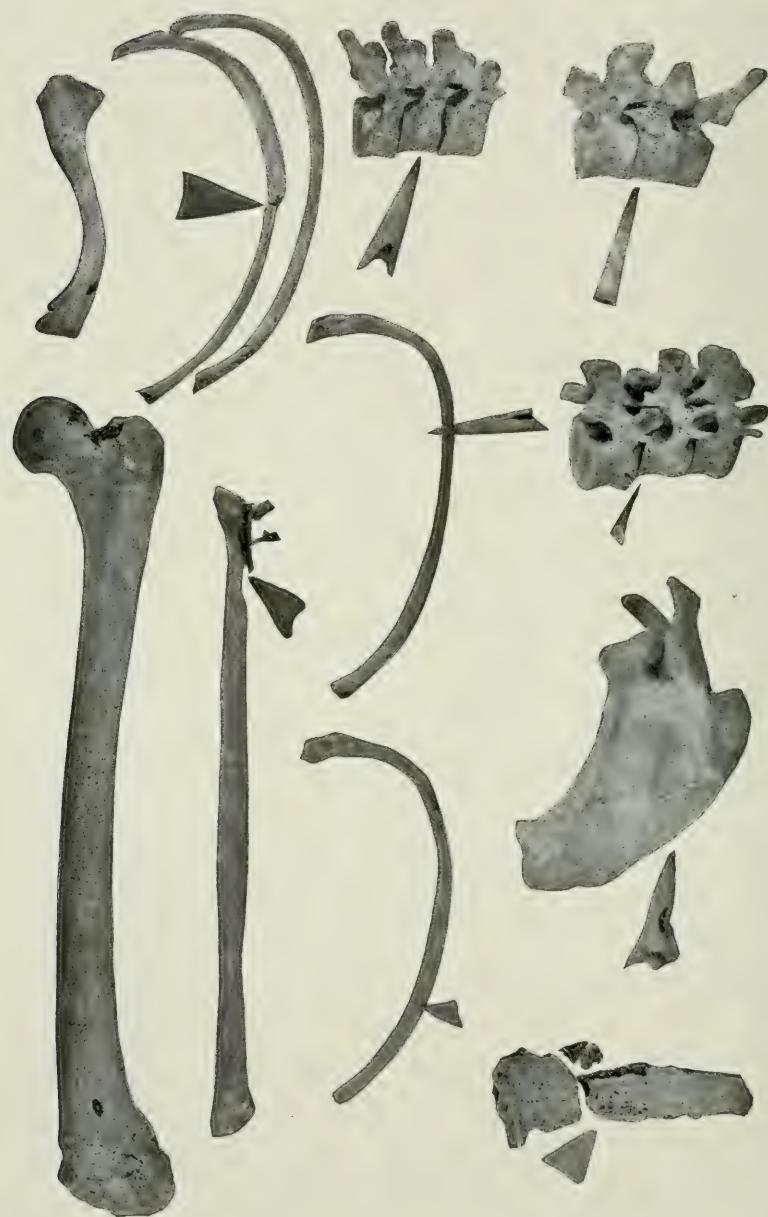


FIG. 7. BONES PUNCTURED BY ARROW POINTS, FROM SKELETONS FOUND ON STATEN ISLAND.

The position in which several of the points were found certainly speaks well for the great force which propelled them. The long bows of the local Indians must indeed have been formidable weapons. Taking into consideration the number of arrows which must have been imbedded in the bodies of the warriors, it is perhaps probable that the majority of the projectiles were driven into the victims at close range after death.

In the wall case (11) south of the exhibit will be found the model of a rock-shelter and typical objects found in such places. These, as the name implies, are protected spots in rocky ledges, where Indians once made more or less permanent places of abode. Many such shelters exist in the vicinity of New York, one or two having been discovered at Inwood, Manhattan (Fig. 1). The most important rock-shelter so far discovered is the so-called

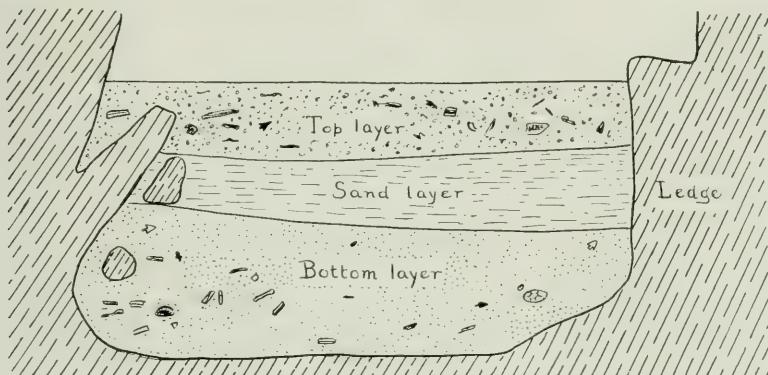


FIG. 8. VERTICAL SECTION OF REFUSE IN FINCH'S ROCK HOUSE, ABOUT MIDWAY OF THE CAVE.

Finch House (Fig. 2) reproduced in the model. The original is near Armonk, Westchester County, New York. One point of special interest is the fact that the Finch shelter contained two layers bearing relics separated by sand as shown in the drawing (Fig. 8). As no pottery was found in the bottom layer, it has been inferred that we have here the remains of two different races of Indians, the older not yet advanced to the pottery-making stage. This conclusion, is, however, far from final, for the whole arrangement may be due to accident.

The table case 8B contains objects selected from the Henry Booth collection illustrating the life of the Indians of the Upper Hudson. They are especially interesting on account of the number of ceremonial "banner stones" found in that region, which are apparently not nearly so abundant anywhere else in this vicinity.

In the next table case the section 9A is devoted to the life history of some of the Iroquois tribes other than the Five Nations of western New York, and the following section (9B) shows, as well as possible, the culture of the Iroquois Indians of central New York and objects used by the Indians of New York State in general manufacture or obtained from the Europeans upon the advent of the settlers. In the upright case (10A) there is presented an exhibition of pottery vessels, all but one of which were found within the limits of Greater New York, and some implements from the Iroquois of the Mohawk Valley, besides material illustrating the societies of the Iroquois. On the other side, (10B), the entire case is filled with specimens from the Bolton and Calver collection from Manhattan Island, which will be more fully described below.

The Types of Indian Relics found in and about New York City.

Having now taken a general view of the exhibit, the visitor may be interested in a study of the several kinds of relics found in this locality. As these types are somewhat different from those found in near-by regions, we conclude that the Indians formerly living here had habits and customs different from those of their neighbors. For want of a better name, these long-extinct tribes have been called the New York Coastal Algonkin. The term Algonkin designates the language they spoke, while the adjective defines their habitat.

In the term New York Coastal Algonkin, the writer includes the tribes along the coast from Tottenville, Staten Island, the extreme southern point of the state, to the Connecticut boundary on Long Island Sound, including to a certain extent the shores of New Jersey immediately adjacent to Staten and Manhattan Islands, the east bank of the Hudson River as far north as Yonkers, and exclusive of Long Island except the western end. From the examination of the remains of the New York Coastal Algonkin area preserved in many collections, both public and private, it becomes obvious that the objects found may be roughly divided into three groups: articles of stone, articles of bone and antler, and articles of clay, shell and metal. The first group is, from the imperishable nature of its representatives, naturally the largest and comprises a number of sub-groups to be briefly described and commented upon in this paper. Examples of this type will be found in the table cases previously mentioned. For the following descriptions and historical notes the author has largely drawn on Mr. James K. Finch's and his own contributions to Volume III of the "Anthropological Papers of the American Museum of Natural History" (New York, 1909).

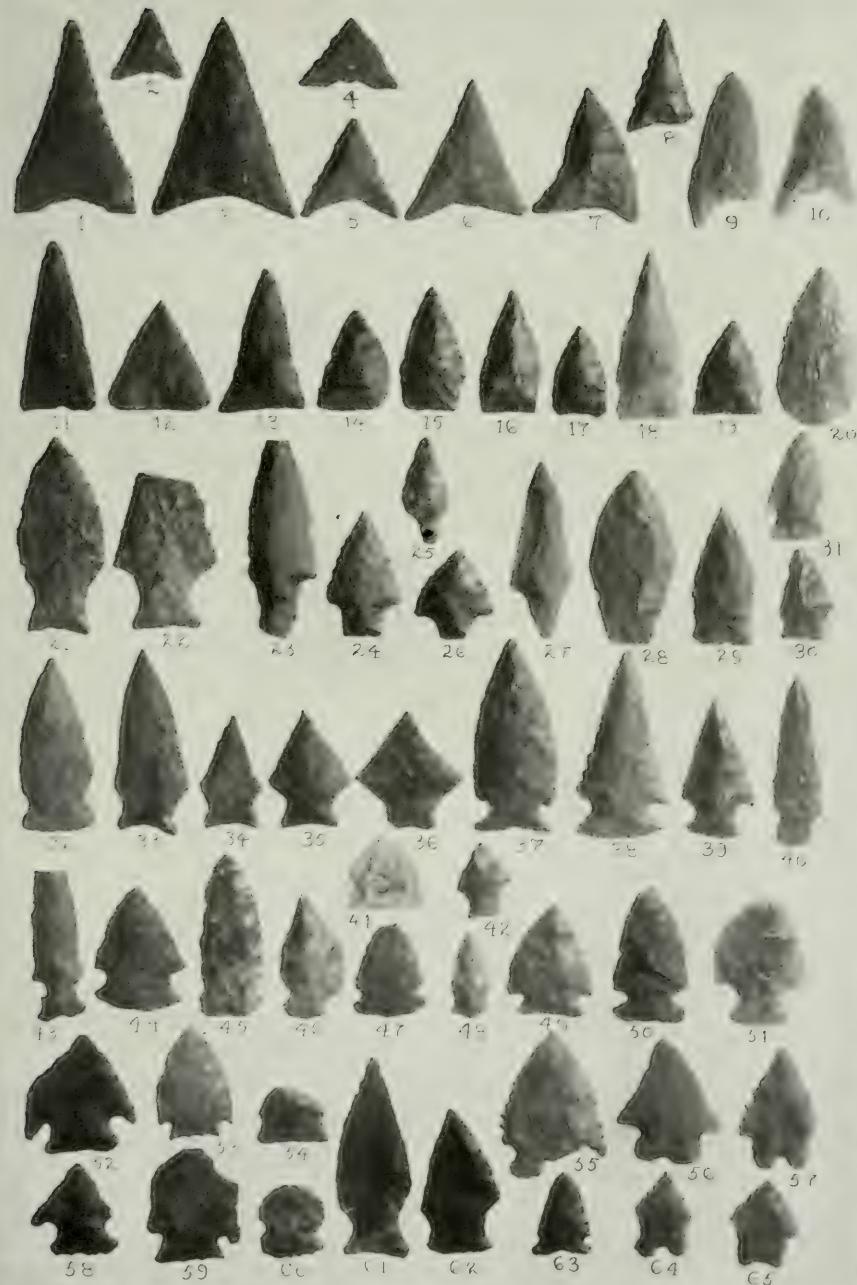


FIG. 9. TYPES OF ARROW POINTS.

CHIPPED ARTICLES.

Arrow Points (Fig. 9). Two general types may be recognized, and these are the stemmed or notched, and the triangular forms. The former are by far the most abundant, and while these are usually made of the nearest local rock possessing the necessary conchoidal fracture, in some cases they are of material brought from a long distance. Specimens made of pink flint resembling stone from the Flint Ridge of Ohio, and of jasper found to the south of this region have been recorded. Blunt arrow points are rare, the Indians probably preferring wooden arrows for this type. Many of the so-called "blunt-points" found in collections, appear to be scrapers made over from broken arrow points of a large size.

The triangular type has long been regarded by the local collectors of this vicinity as being the type used in war, the argument being that as it has no stem, it was necessarily but loosely fastened in its shaft and, if shot into the body, would be very liable to become detached and remain in the flesh if any attempt were made to withdraw it by tugging at the shaft. While it was no doubt perfectly possible to fasten a point of triangular shape to the shaft as firmly as a notched point, the discoveries of Mr. George H. Pepper at Tottenville, Staten Island, where twenty-three arrow points were found in and among the bones of three Indian skeletons, tend to strengthen this theory. While the majority were of bone or antler, all those made of stone were of this type, and indeed most of the bone points were also triangular in shape. However, it is well to bear in mind that arrow points of triangular type have been used for every purpose by all the early Iroquois tribes of New York.

Spear Points and Knives (Fig. 10). None of the early accounts of contemporary European writers seem to mention the use of spears (other than bone or antler-headed harpoons) by the Indians hereabouts, and it is probable that the larger arrow-point-like forms found were used as knives or cutting tools. They are usually notched or stemmed, rarely triangular, and occasionally round or oval. They vary in size, but it must be remembered that one tool may have had various uses, and that drills, knives and scrapers may often have been combined in one implement.

Scrapers (Figs. 10 and 11). Scrapers were probably used in dressing skins, and in sharpening bone implements, woodworking and for various other purposes. These are usually mere flint flakes chipped to an edge on one side. Nevertheless, notched and stemmed forms, requiring some care in their making do occur. Broken arrow points were occasionally chipped down to serve this purpose. A single serrated scraper has been found.



FIG. 10. KNIVES AND SCRAPERS.

These are very rare in both the Algonkian and Iroquoian areas of New England and the Middle Atlantic States. One very large stemmed scraper, of a type more common in the far west, also comes from this locality.

Drills (Fig. 11). These are usually chipped tools presenting an elongated narrow blade and a considerably swollen or expanded base, suitable for grasping in the hand. In some cases the base was absent and those were probably hafted in wood. Specimens whose blades have a square or rectangular cross section are very rare. The finding of cores left in half-drilled objects shows the use of a hollow drill, and it has been suggested that a hard hollow reed used with sand and water on a soft stone would produce this effect. To bear out this assertion, it has been reported that a half-drilled implement has been found (outside this area on the upper Hudson) in which the remains of the reed drill were found in the cavity left by its action.

ROUGH STONE ARTICLES.

Hammerstones. These vary from simple pebbles picked up and used in the rough, showing merely a battered edge or edges acquired by use, to the pitted forms. They are generally mere pebbles with a pit pecked on two opposite sides, perhaps to aid in grasping with the thumb and forefinger. Some have battered edges, but many have not, suggesting, when round and regular, a use as gaming or "Chunké" stones, or as implements used only in pounding some soft substance. Hammerstones, pitted on one side only, and others with many pits on all sides, occur. These latter may have had some special use, and are not to be confounded with the large flat, slab-like stones having pits only on one side, found in other regions, and perhaps used as receptacles for holding nuts while cracking them. While these are common in the Iroquoian area, they are unknown here.

Large stones, single or double pitted, resembling oversized hammerstones occur, and these may have been used as anvils in chipping flint or for like purposes.

Grooved clubs or mauls, also showing use as hammers are found. These are rare and are usually either rough pebbles, grooved for hafting, as in the case of the grooved axe, or grooved axes, the blades of which have become so battered, broken and rounded by wear as to preclude their further use for chopping.

Net-sinkers. On all sites near the water, either salt or fresh, net-sinkers show the prevalence of fishing. These are of two types. In one case a pebble is notched on opposite sides of either the long or broad axis; in the other a groove is pecked around the entire pebble in the same manner. The

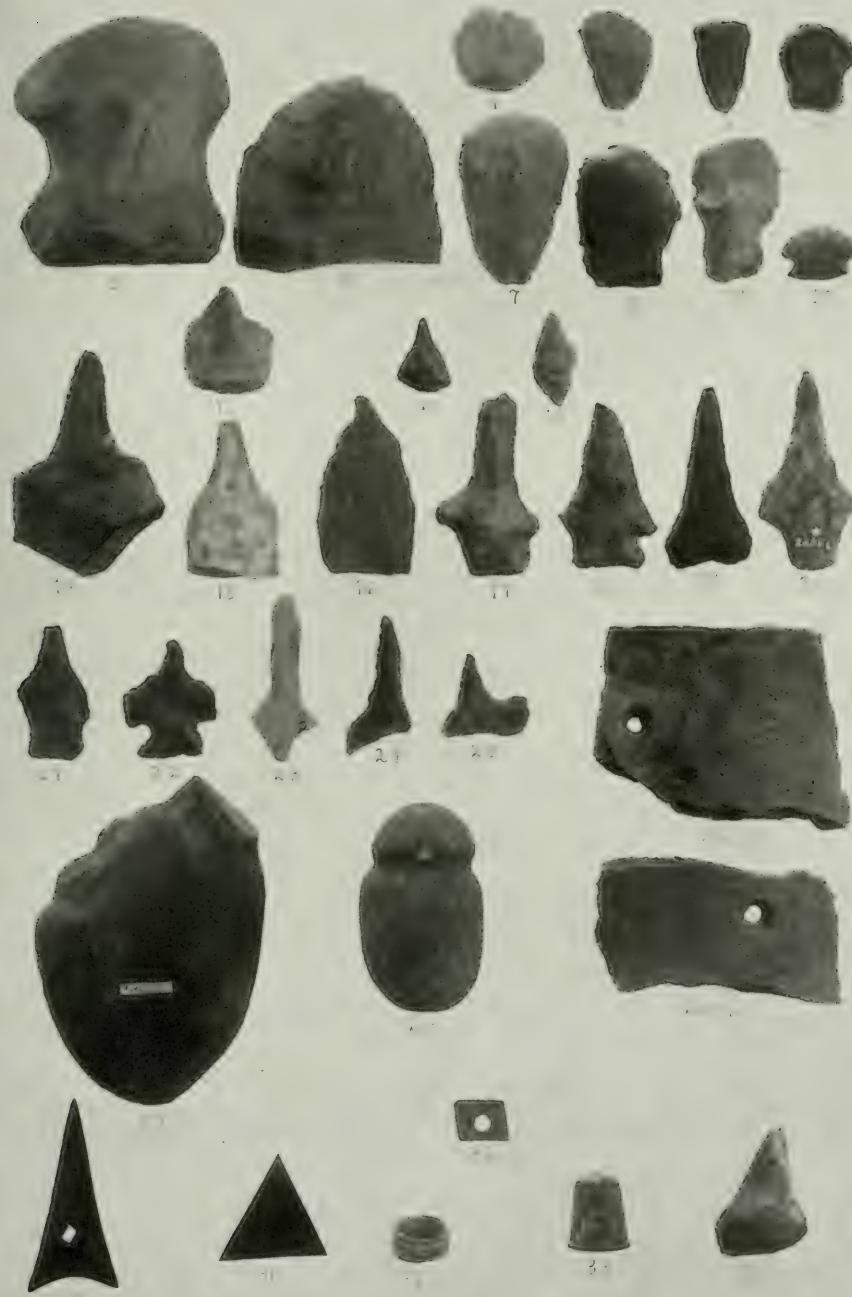


FIG. II. DRILLS, SCRAPERS AND OTHER OBJECTS.

latter type is comparatively scarce, as the former, being more easily and quickly made, was just as useful to the savage. The modern Cree and Ojibway, residing in the forests north of the Great Lakes, still use pebbles for this purpose, but those observed by the writer were not notched or worked in any way. Occasionally, sinkers notched on both axes are found in this region.

Hoes. These are usually ovoid implements, chipped from trap rock and sometimes notched to facilitate hafting, and sometimes not. They usually show a slight polish on the blade, caused by friction with the ground. This stone type of hoe is the form mentioned by early writers; but perhaps hoes of shell, bone or tortoise shell, and wood were used also. None of these, however, are still in existence.

Hand Choppers. Pebbles chipped to an edge on one side, for use as hand choppers, occur. These are occasionally pitted on both sides.

Grooved Axes (Fig. 12). For the purposes of this paper, the writer, while aware that many grooved axes are well made and polished, has decided to include them under the head of "Rough Stone Articles," as by far the greater majority of the grooved axes and celts from this region lack the polish and finish belonging to other articles later to be described. Grooved axes are of two sorts: *a*, those made of simple pebbles, merely modified by grooving and chipping or pecking an edge; and *b*, axes which have been pecked and worked all over and sometimes polished. The latter (*b*) may be said to include:

1. Groove encircling three sides of blade, one side flat.
2. Ridged groove encircling three sides of blade, one side flat.
3. Groove encircling three sides of blade, longitudinal groove on flat side.
4. Groove encircling three sides of blade, longitudinal groove on flat side and opposite.
5. Groove encircling blade.
6. Ridged groove encircling blade.

A seventh type, having a double groove encircling the blade, may occur in this territory, but has never been reported. A specimen from the Hudson River region, just north of the area here dwelt upon, is in the Henry Booth collection in this Museum. While most worked stone axes have been pecked into shape, a few have been fashioned by chipping, but these seem to be rare.

Grooved axes were hafted in various ways. During the summer of 1908, the eastern Cree living in the vicinity of the southern end of Hudson Bay told the writer that their ancestors, who made and used such axes, hafted them by splitting a stick and setting the blade in it, then binding the handle together with deer-skin (probably rawhide) above and below the split. No specimens of the grooved axe in the original haft seem now to be extant.

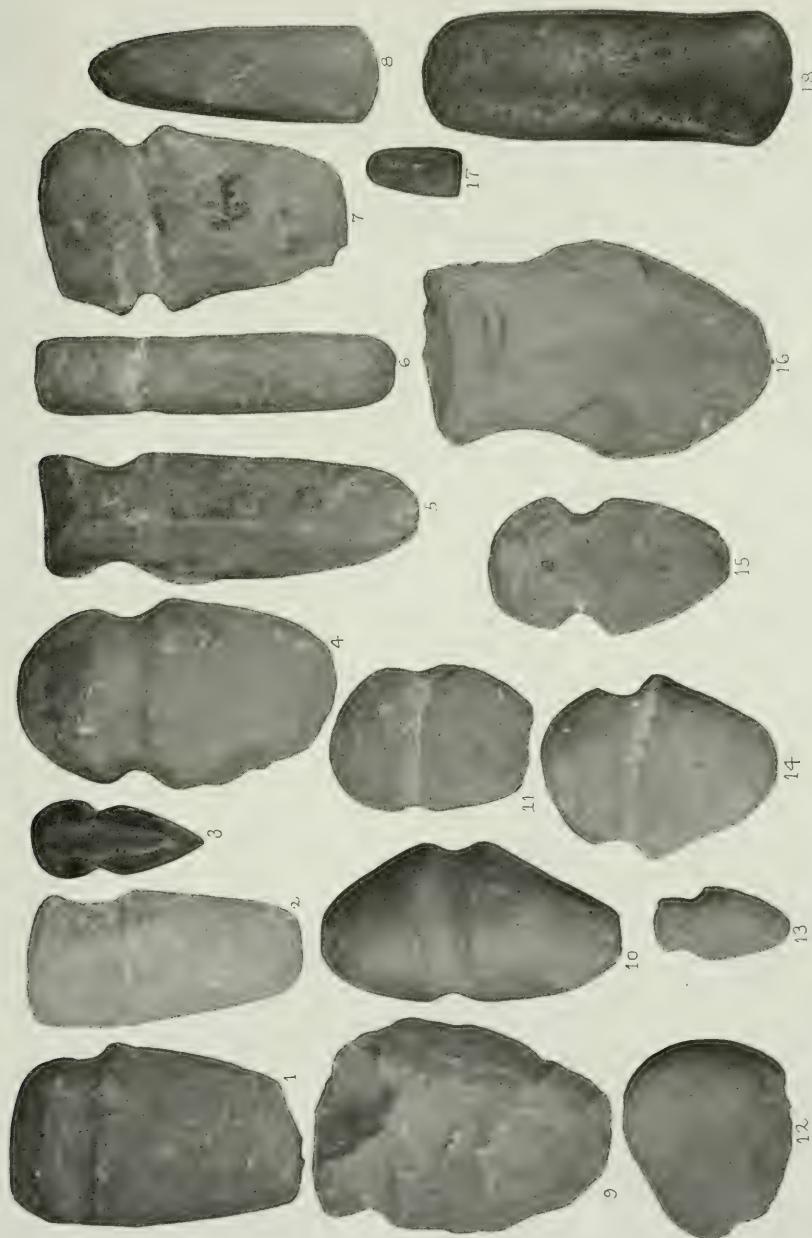


FIG. 12. TYPES OF STONE AXES AND CELTS.

from any locality in the East. From the battered appearance of the butts of these axes, it may have been that they were sometimes used in lieu of mauls or hammers. It is possible that they may have been used in war. It is generally supposed that in cutting down trees, making dug-out canoes and other kinds of wood-working, fire was used as an adjunct to the stone axe, the former being the active agent. The process of burning and charring having gone on sufficiently, the stone axe was used to remove the burned portion. However, some stone axes seem sharp enough to cut quite well without the aid of fire.

Celts (Fig. 12). Ungrooved axes or hatchets, usually called celts, are frequent throughout this area; but are nowhere as abundant as the grooved axe, especially near the southern border of the region. The grooved axe seems to have been the typical cutting and chopping tool of the local Algonkin. The widespread idea that the celt was sometimes used unhafted as a skinning tool, has no historic proof, but may possibly have some foundation. The Cree of the southern Hudson Bay region use an edged tool of bone for this purpose, a fact which is somewhat suggestive, although the implement differs in shape from the celt. Celts with one side flat and the other beveled to an edge may have been used as adzes. From the worn and hammered appearance of the polls of some celts, it is possible that many of these implements were used as wedges in splitting wood, after constant manipulation in their chopping capacity had permanently dulled their edges.

The celts of this region are, as a general thing, poorly made, a pebble of suitable shape having an edge ground on it with little or no preliminary shaping. More rarely, however, they were carefully worked all over by pecking and polishing, as in the case of the grooved axe.

In type, aside from the general division of rough and worked celts, we may add that most celts in this region have slightly rounded polls, the bit broader than the butt, although some exceptions have been found. The forms are as follows: *a*, rough stone celts, pebbles with one end ground to an edge, but otherwise scarcely worked: and *b*, worked stone celts, which include the following:

1. Wedge-shaped, poll narrower than bit, and angles rounded; common.
2. Like number one, but with bit much broader than poll. Very rare.
Cross-section oval.
3. Like number one, but one side flat, other beveled at one end to make a cutting edge.
4. Like number two, but with cutting edge flaring, broader than body.
"Bell-mouthed type." Very rare.

North and west of this region, we find the Iroquois territory where most

worked celts are angular, having almost invariably a rectangular cross section and squared butt. Types 1 and 3 also occur, but the celt with the rectangular cross section seems most typical of the Iroquoian region. Many small celts, made of flat fragments or chips of stone, are also found in this area, and these could scarcely have had a use as chopping tools.

In the Niagara watershed and extending eastward as far as the Genesee valley, an angular adze-like form having a trapezoidal cross section occurs. It is found principally in what was the territory of the Attiwandaronk, Kah-

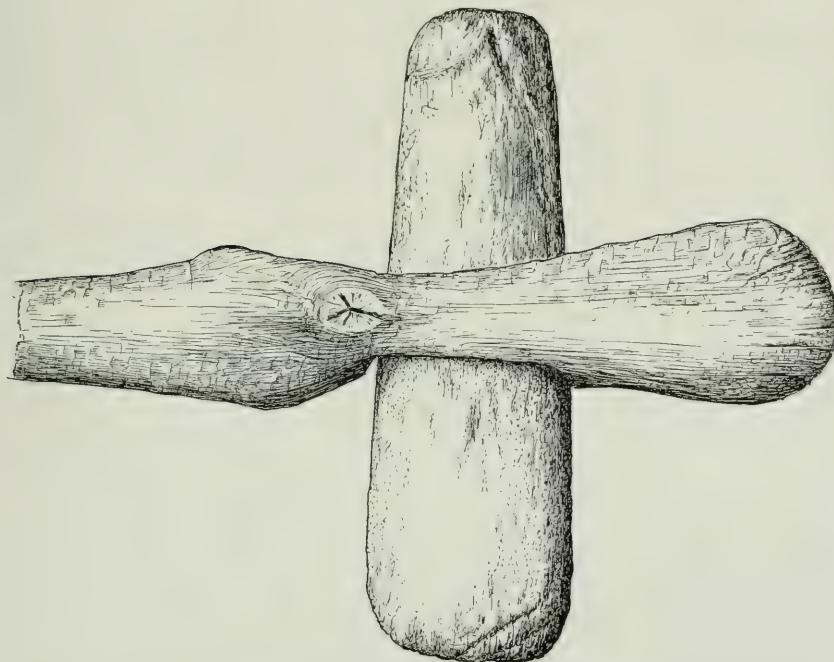


FIG. 13. A HAFTED CELT FROM A POND AT THORNDALE, DUTCHESS CO., N. Y.

Length of celt 16.6 cm.

Kwah, or Neutral Nation (an Iroquoian tribe, early annihilated by the Five Nations). It also occurs, as has been stated, on the sites of villages of the Iroquois proper, but is not abundant. South of the Iroquois in central Pennsylvania, another form which does not occur in this region is the chipped celt, usually of flint or other hard stone. This form is, however, frequent in the country about the headwaters of the Delaware.

In the "American Anthropologist," Vol. 9, No. 2, p. 296 *et seq.*, Mr. C. C. Willoughby has figured and described the celts of the New England

region with remarks on the methods of hafting employed. These seem to be two in number, and consist, in the case of the larger forms, of setting the blade through a hole in the end of a club-like handle, the butt or poll projecting on one side and the blade on the other as in Fig. 13, found in the muck of a pond bottom at Thorndale, Dutchess County, New York, a region once in the Mahican territory. Smaller celts were set into a club-like handle, the butt resting in a hole or socket.

Adzes. These seem to be of two kinds, the first and most simple being celt-like, but flat on one side, the other side being beveled to an edge on one side. The second form differs in having a groove, which is not infrequently ridged. Occasionally, adzes with two parallel grooves occur. They were probably hafted by taking a stick at one end of which projected a short arm at right angles with the shaft, laying the flat side of the blade against this arm and binding it on with sinew, thongs or withes. The groove, of course, was of aid in securing the blade to the handle. Adzes of stone, hafted in this manner, have been obtained on the North Pacific coast. The celt adze seems not uncommon, but the grooved adze is rare, neither form being nearly so abundant as in the New England region.

Gouges. The stone gouge is rare, and seems always to be a plain, single-bladed affair without the transverse grooves so frequently seen in New England specimens, and hereabouts is always easily distinguished from the adze. Less than half a dozen specimens have been seen by the writer from this entire area, although probably quite as much work in wood was done by the New York coastal Algonkin as by the New England Indians.

Pestles. The long pestle occurs throughout the region of the Coastal Algonkin of New York, but is nowhere as abundant as in New England. They seem always to have been used with the wooden block mortar hereabouts, and are mentioned by the early writers as part of the household equipment of the natives. They do not seem to have been used by the Iroquois to the north and west of this area either in early or later times. The wooden pestle of dumb-bell shape seems to have been preferred by them. The latter is used by the Canadian Delaware and may have taken the place of the long stone pestle to a great extent in this region.

Mullers, Grinders, and Polishing Stones. These are frequent, and consist merely of rounded pebbles, shaped and worn by use, probably most often in crushing corn. They are mentioned by De Vries as being used by the Indians with a flat stone slab for grinding corn when traveling. Some seem to have been used for polishing stone implements, but it seems hard to draw the line, as the appearance gained from friction would be quite similar. Such mullers and their attendant slabs, used for preparing corn meal have been collected within a few years in use among the Oneida Iroquois of New York, one specimen being in the American Museum collection.

Sinew Stones. These are pebbles showing grooves along the edges, popularly supposed to have been worn there by rubbing thongs and sinews across the edges to shape them. They occur generally, but are not common.

Stone Mortars. These are common, but rather local, some sites having none at all, and others a good many. One locality on Staten Island is notable for the numbers found there, whereas they are rare elsewhere in that vicinity. They may be divided into the following types:

1. Portable mortar, hole on one side.
2. Portable mortar, hole on both sides (New Jersey type).
3. Portable slab mortar or metate, used on one or both sides.
4. Bowlder mortar, one or more holes, immovable.

The first two types are the most abundant, the third is not uncommon; but the fourth is very rare, only one or two being reported. As above stated, De Vries claims that the portable mortars were used in bread-making, while the Indians were traveling, but certainly the majority of those found are far too heavy for this purpose.

Pigments and Paint-cups. Fragments of pigments such as graphite and limonite, showing the marks of scratching with scrapers, are found, which have apparently supplied the material for painting. Worked geodes are common on many sites. These show traces of chipping in some instances and may have been paint cups. There is a tiny pestle-shaped pebble in the Museum collection from Westchester County, which is said to have been found with a geode of this type. The popular theory is that such geodes were used as "paint cups" and this seems probable.

Stone Plummets. These are very rare, in contrast to their abundance in the New England region. They consist usually of small worked egg-shaped stones, grooved at one end, probably for suspension. The writer has seen but one from this area. Their use is problematic.

Semilunar Knives. Knives of rubbed slate, similar in appearance to the "ulu" or woman's knife of the Eskimo are found, though rarely, in this region. While sometimes ascribed to Eskimo influence or contact, it is possible that this form (which occurs throughout New England), judging by its distribution, may have been native to the eastern Algonkin also. The eastern Cree still use knives of this type as scrapers. Like most other forms common in New England, it is less abundant in the southern part of this area.

Stone Beads. Various pebbles generally perforated naturally are to be found on some sites, and may or may not have been used as beads or pendants. On Staten Island, at Watchogue, Mr. Isaiah Merrill once owned a number of square beads of pinkish steatite (?), all but one of which have been lost, and which he claims were found on his farm.

POLISHED STONE ARTICLES.

Gorgets. Two types of the gorget occur. These are the single-holed pendant form, which is the less abundant of the two, and the double-holed type. The latter is flat, rectangular in shape and generally well polished. It usually has two perforations a short distance from the middle. The modern Lenapé of Canada claim to have used these as hair ornaments. Probably the two-holed variety is typical of the Algonkian peoples of this region, the single-holed form being on the other hand, the most abundant on old Iroquoian sites. Specimens of the latter have been obtained in use among the Canadian Iroquois, and some of them are in the Museum collections.

Amulets. Certain problematic articles of the "bar" and even "bird amulet" type have been found, but these are probably exotic in origin and are not characteristic of the archaeology of the region in question.

Banner Stones. These beautiful polished stone implements of unknown use may be divided into three great classes, with several sub-types as follows:

1. Notched banner stones.
2. Grooved banner stones.
 - a. Groove on both sides.
 - b. Groove on one side.
3. Perforated banner stones.
 - a. Plain.
 - b. Butterfly.

All three types seem equally abundant, but the notched banner stones appear to be the oldest form and occur under circumstances pointing to great relative antiquity. They are found, however, on the more recent sites as well. Both notched and grooved banner stones are usually more rough in appearance than the perforated type, and the writer has never seen a polished specimen of the first class. On the other hand, the grooved variety frequently exhibits the high degree of finish characteristic of the perforated forms. Banner stones grooved only on one side are less common than the other forms. While the latter class is generally made of slate, steatite or some similar soft and easily worked material the notched and grooved forms, especially the former, are often formed either from naturally-shaped pebbles or chipped roughly into shape. Implements, usually naturally-shaped stones with little working, without notches, grooves or perforations, but greatly resembling the notched and grooved banner stones in shape, are not infrequently found on aboriginal sites hereabouts and may have served as banner stones. There seem to be neither records nor plausible theories as to their use.

Pipes. Stone pipes, invariably made of steatite, are very rare. Four types have been noted as follows:

1. Monitor or platform pipe, platform not projecting before the bowl.
2. Monitor or platform pipe, platform projecting before bowl, with or without tiny carved stem or mouthpiece. Of the latter, one specimen is known.
3. Trumpet-shaped stone pipe.
4. Rectangular stone pipe, human face carved on front of bowl.

It may be remarked that more stone pipes have been reported from the Indian cemetery at Burial Ridge, Tottenville, Staten Island, than from all the rest of the area put together. The second and third types are represented by one specimen each from Burial Ridge and from nowhere else in this region. Four or five pipes of the first class have been found there as well. The last class is represented by a single specimen obtained by Mr. W. L. Calver at Inwood, Manhattan Island. Undoubtedly the clay pipe was the most common form used in this locality.

Steatite Vessels. These are not at all abundant, though occurring almost everywhere. They were doubtless all imported from New England, as there are no steatite quarries within the range of the New York Coastal Algonkin. The single form found is that common in the east, an oblong, fairly deep vessel with a lug, ear or handle at each end (Fig. 14j). Occasionally, such vessels are ornamented by rude incisions along the rim.

ARTICLES OF CLAY.

Pottery Pipes are common everywhere. They are usually manufactured of a better quality of clay than that used for vessels, and bear fairly similar designs. They are susceptible of division into the following classes:

1. Straight pipe, bowl expanding slightly.
2. Bowl much larger than stem, leaving it at an angle of forty-five degrees. Stem round.
3. Same as number 2, but stem angular and much flattened.
4. Effigy pipes, (represented by a pottery human head apparently broken from a pipe bowl, obtained by Mr. M. R. Harrington at Port Washington, Long Island).

The straight pipe seems to have been obtained only on Staten Island on the north shore in the region occupied by the Hackensack. While nowhere as abundant as upon the Iroquoian sites of central and western New York, the clay pipe is rather common and is a prominent feature in the coast culture of New York (Fig. 15a). It is more abundant perhaps in the southern part

of the area, but this may well be due to the fact that data from this region are more easily accessible. The triangular-stemmed "trumpet" pipe so common on the Iroquoian sites is unknown in this region.

POTTERY VESSELS.

The pottery of this region may all be considered as being either the native Algonkian in type or showing Iroquoian influence with a third and intermediate variety. Algonkian vessels may be divided into the following groups according to shape:

1. Conical, pointed bottom, slightly swollen sides, circumference largest at the mouth, — the typical Algonkian pot of this area, Fig. 14a.
2. Like number 1, but much rounder and broader, Fig. 14b.
3. Bottom pointed, sides slightly swollen, neck slightly constricted, Fig. 14c.
4. Identical with number 2, except that just below the beginning of the neck, occur small raised lugs, ears or handles. This is rare from this area, Fig. 14d.
5. Rounded bottom, somewhat constricted neck, lip sometimes flaring, or even turning down and back, Fig. 14e.

The intermediate types are as follows:

6. Rounded bottom, constricted neck, narrow raised rim or collar, Fig. 14f.
7. Like number 6, but with sides more elongated and bottom more oval than round, heavier collar, generally notched angle, with or without a series of small humps or projections at intervals, Fig. 14g.

The Iroquoian types are as follows:

8. Mouth rounded, collar or rim heavy, with humps or peaks at intervals, angle notched, neck constricted and bottom rounded; can stand by itself, an unknown feature in local Algonkian vessels, Fig. 14h.
9. Same as number 7, but with mouth square, and humps at every angle. Much less common than the preceding, Fig. 14i.

In size, the vessels range from small toy-like pots to jars of very large capacity. In general they appear to have been made by the coil process, and are tempered with pounded stone or fine gravel, mica or burned or pounded shell. Sherds showing tempering by fibre or some other substance that disappeared in firing are rarely found. When vessels were cracked or broken, a series of holes was bored opposite each other on either side of the break and the parts laced together, rendering the vessel capable of storing dry objects, at least.

Life forms are exceedingly rare in local ceramic art. From Manhattan Island and Van Cortlandt Park, there come a number of specimens showing incised human (?) faces. This is not an uncommon form on Iroquoian sites in central and western New York. On the Bowman's Brook site at Mariner's Harbor, Staten Island fragments of a typically Algonkian pot were obtained which bore at intervals, rude raised faces. With the sole exception of a rather well-modeled clay face, apparently broken from the

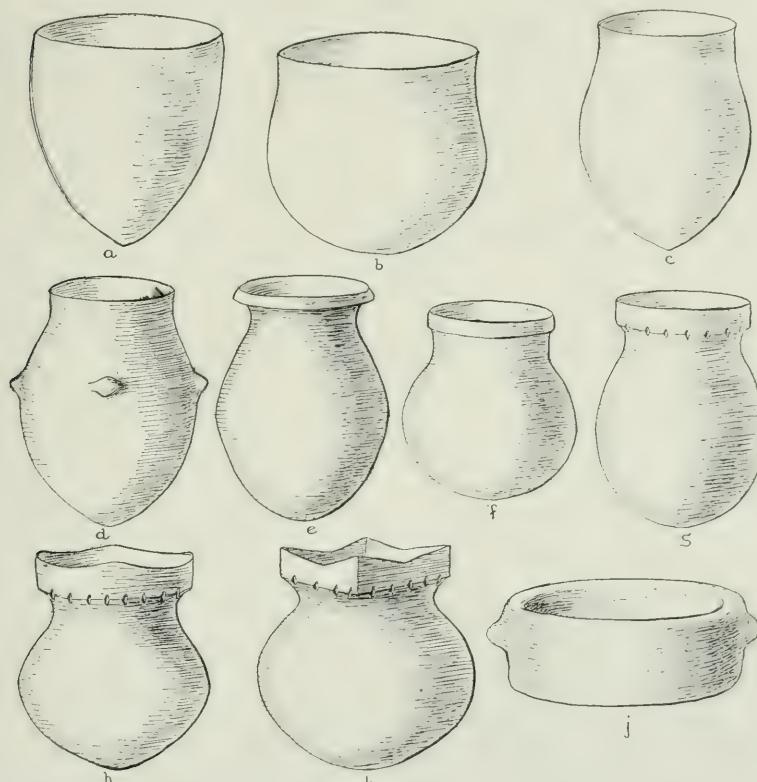


FIG. 14. POTTERY FORMS OF THE COASTAL ALGONKIN.

bowl of a pipe (Fig. 15b) found at Port Washington, Long Island, by Mr. M. R. Harrington, this brief statement concludes the list of pottery life forms reported from this area, although others may yet be found here, since some interesting objects have been collected in immediately adjacent territory.

The forms of decoration consist of stamping with a stamp, roulette or paddle, and incision (Figs. 16 and 17.) Occasionally, but very rarely,

stucco work occurs. Under stamping we can enumerate the following processes:

1. Impression with the rounded end of a stick (rare).
2. Impression with the end of a quill, or hollow reed, leaving a circular depression with a tiny lump or nipple (rare) in the center.
3. Impression with a section of a hollow reed, making a stamped circle (rare).
4. Impression with finger nail (doubtful, but perhaps used on some sherd from Manhattan Island).
5. Impression of the edge of a scallop shell.
6. Impression with a carved bone, antler or wooden stamp.
7. Impression of a cord-wrapped stick.
8. Impression with roulette.

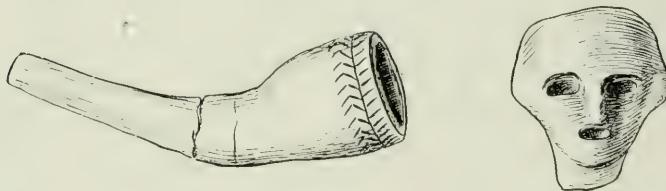


FIG. 15. TYPICAL ALGONKIAN POTTERY PIPE AND FRAGMENT OF AN EFFIGY PIPE FROM PORT WASHINGTON, L. I.

Under the head of decoration by incision we can enumerate the following:

9. Incised decoration, probably made with a stick.
10. Incised decoration, possibly made with a flint object (only one specimen at hand).

The paddle was frequently used to finish the sides and bottom of the pot by imparting an appearance of pressure with fabric when the clay was wet.

11. Stucco. Occasionally, ridges of clay placed on the rim for ornament appear to have been added after the shaping of the vessel.

Ornamentation is usually external, and vessels, either Algonkian or Iroquoian, are rarely ornamented below the rim, although occasionally the designs run part way down the side in the case of the Algonkian forms. Where decoration has been applied by one of the stamping processes, and more rarely by incision, it is sometimes continued over the lip or rim for an inch or less on the inside. This only occurs in the typical Algonkian forms, and is never seen when incised ornamentation is used. The rims of Iroquoian vessels are never ornamented on the interior, nor is stamping so frequently practised on vessels of this class. The intermediate forms, at least the first of the two mentioned, are frequently ornamented on the interior

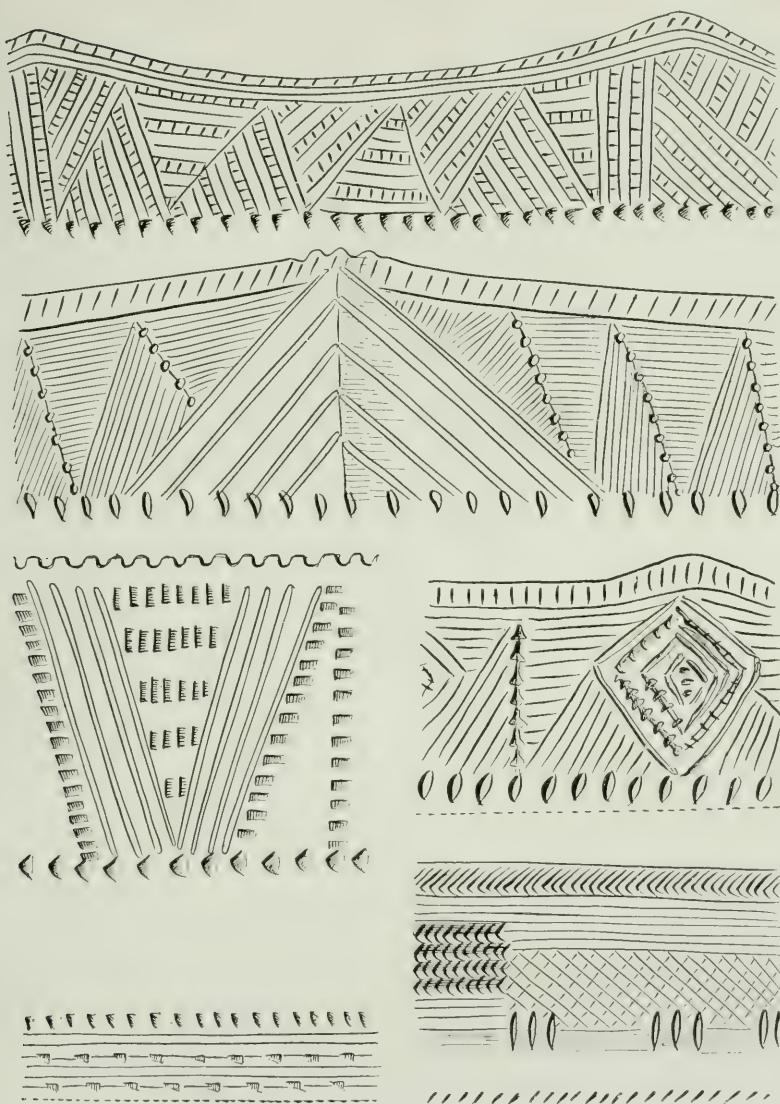


FIG. 16. INCISED DESIGNS FROM POTTERY VESSELS.

a, *b*, and *d*, designs from Iroquoian vessels; *c*, design from an Algonkian vessel; *e*, design from a vessel of the Iroquoian type from a Connecticut rock-shelter, introduced here for comparison.

of the lip. This internal decoration is much more common in the southern portion of this area than elsewhere in the vicinity.

In design, we must of course, give up all thought of trying to obtain symbolism, if such there were, for there are no sources now left upon which to base our assumptions. Certain conventional types of decoration seem to have been in vogue, usually consisting in rows of stamped or incised parallel lines and much more rarely of dots regularly arranged in the same manner. Zigzag, chevron and "herring bone" patterns are the most common, but other angular forms occur, and rows of parallel lines encircling the vessel are sometimes to be found. Stamping and incision as decorative processes never seem to occur on the same vessel. Curvilinear decoration is exceedingly rare, and not enough material is at hand to show that patterns were used, possibly these were scrolls of some form. On account of the lack of material, it cannot be determined whether the designs on the Algonkian

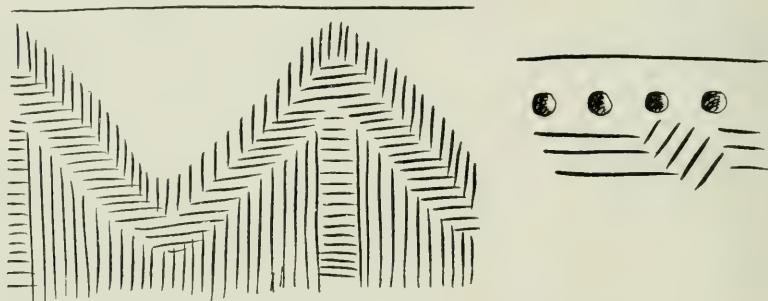


FIG. 17. INCISED DESIGNS FROM ALGONKIAN VESSELS.

vessels differ from those on the Iroquoian, except in a very general and unsatisfactory way.

The angle formed where the heavy rim or collar leaves the constricted neck of the Iroquoian vessel is almost invariably notched, and as such collars and angles do not occur on vessels of the true Algonkian type, this feature is necessarily absent from them. It is noticeable that Iroquoian vessels are usually decorated with incised designs, rather than stamped patterns.

Pottery is found abundantly on the majority of the sites in this district; but, while very much more common than in the New England area, it does not equal in abundance that from the Iroquois country. It is rarely found buried in graves with skeletons as in the Iroquoian area; when sometimes found in graves, however, it is usually at some distance from the human remains and apparently not connected with them. Whole or nearly whole vessels are exceedingly rare and the number of those found up to date may

easily be counted upon the fingers. Potsherds taken from pits or shell heaps, where they have not been exposed to the action of the weather, are often as thickly covered with grease as when they were broken and cast aside.

ARTICLES OF METAL.

Beads. Beads of native metal, consisting simply of pieces of hammered sheet copper rolled into small tubes, have been found, but they are very rare. Copper salts, but no objects, were found upon the bones, especially on those of the head and neck, of a child's skeleton at Burial Ridge, Tottenville, Staten Island, which seemed to predicate the use of copper beads. A great many beads of *olivella* shell, some of them discolored by copper salts, were found about the neck of the skeleton. A single celt of copper is said to have been found in Westchester County, probably on Croton Neck, slightly above the limit of the territory treated in this paper.¹

ARTICLES OF SHELL.

Wampum. Objects of shell are not at all common, and notwithstanding the coast region of New York was one of the best known localities for wampum manufacture on the continent, wampum beads are almost unknown from local sites. With the exception of completed beads, most of which may have been shipped into the interior, wampum may be found in all stages of manufacture. We refer to the white wampum, for traces of the "black" (blue) wampum made from the hard clam or quahog are so far not reported. The process of manufacture may be shown by shells with the outer whorls broken away in steps until the innermost solid column is reached, ground and polished at the end, and needing only cutting off into sections and perforations to make the finished white wampum bead. These do not occur on all sites, though they have been found here and there throughout the region. Ninety-six conch shells with the outer whorls broken entirely away were found in a grave at Burial Ridge, Tottenville, Staten Island, about the head and neck of a skeleton.

Pendants. Occasionally oyster and clam shells, found unworked save for perforations in them, may have been pendants or ornaments, but certainly have little æsthetic value.

Scrapers. Clam shells seem to have been used as scrapers and some are

¹ Native copper occurs in the New Jersey trap ridges, within a few miles of New York City, an important source in Colonial times being near Boundbrook 30 miles from the lower end of Manhattan Island. Bowlders of native copper occur in the glacial drift. EDITOR.

occasionally found with one edge showing the effect of rubbing and wearing. These are rare, however. Some may have been pottery smoothers. Clam shells have been reported which contained central perforations and were identical in appearance with some shell pottery scrapers and smoothers collected by Mr. M. R. Harrington among the Catawba. Contemporary writers mention the use of knives made of shell.

Pottery Tempering. This was sometimes done with calcined and pounded shells, but was uncommon, considering the abundance of the material at hand. Pounded stone or gravel seems to have been more favored.

Pottery Stamps. The corrugated edge of a scallop shell was frequently used as a stamp for pottery, as may be seen by examining the potsherds from this region.

ARTICLES OF BONE AND ANTLER.

Objects of bone and antler, while perhaps more abundant here than in New England, are far less plentiful in form and number than in the Iroquoian area. Cut bones are frequent in most shell pits and heaps. They were cut by grooving the bone partly through on all sides, probably with a flint knife, and breaking.

Bone Awls. These utensils are the most common of all bone articles in this region and are found in almost every part of the area. Some are merely sharpened slivers, but others show a considerable degree of work, and are well finished and polished. They are usually made of deer or other mammal bone, but sometimes from the leg bones of birds.

In some instances, the joint of the bone is left for a handle, but this is often cut off. Grooved, perforated or decorated bone awls are extremely rare in this region. While it is generally considered that these bone tools were used as awls in sewing leather, as by modern shoemakers, nevertheless, they may have served as forks in removing hot morsels from the pot or for a number of other purposes. The latter supposition is supported by the abundance of bone awls found in some shell pits. The northern Cree of the Hudson Bay region use a similar bone implement as the catching or striking pin in the "cup and ball" game.

Bone Needles. These are rare, but found in most localities. They are generally made of the curved ribs of mammals and are six or eight inches long, or even longer. They are generally broken across the eye, which is usually midway between the ends. A few with the perforation at one end have been reported.

Bone Arrow Points, usually hollow and conical in shape, have been found,

especially at Tottenville, Staten Island, in the Burial Ridge. They are rather rare, but this may be due to the fact that conditions are not suitable for their preservation in most localities. Others are flat and triangular in shape.

Harpoons. No actual barbed bone harpoons, such as occur in the Iroquois country have been reported from this region; although the writer has seen what appeared to be part of one from Shinnecock Hills, Long Island, whence comes a harpoon barb of bone, found by the writer, now in the Museum collection, which was apparently made to tie to a wooden shaft. While neither of these forms seems to occur within this region, several naturally barbed spines from the tail of the sting-ray, found on the Bowman's Brook site, at Mariner's Harbor, Staten Island, may have been used as harpoons or fish spears, for which purpose they were admirably suited by nature. Long, narrow, chipped stone arrow-heads are generally called "fish points", but they do not seem peculiarly adapted for this purpose and the name is probably a misnomer. No bone fish hooks are reported from hereabouts, though suggested by early writers.

Bone Beads and Tubes. While so abundant on Iroquoian sites, tubes and beads made of hollow bird or other animal bones, polished and cut in sections, are very rare here.

Draw Shaves, or Beaming Tools, made of bone, and probably used for removing the hair from skins, were made by splitting the bone of a deer's leg, leaving a sharp blade in the middle with the joints on either end as handles. The writer has seen none from this immediate region, but they are reported by Mr. M. R. Harrington. A number were obtained for the Museum by Mr. Ernst Volk in the Lenapé sites near Trenton, New Jersey. An implement, evidently made of the scapula of a deer, and perhaps used as a scraper, was found in a grave at Burial Ridge, Tottenville, Staten Island, by Mr. George H. Pepper.

Worked Teeth. Perforated teeth of the bear, wolf and other animals, so abundant on Iroquoian sites never seem to be found here. Beavers' teeth, cut and ground to an edge, occur, and may have been used as chisels, or primitive crooked knives, or both, as they were till recently by some of the eastern Canadian Algonkin. Other cut beaver teeth may have served as dice or counters in gaming.

Turtle Shell Cups. These are common, and consist merely of the bony carapace of the box turtle (*Tranene caroline*), scraped and cleaned inside, the ribs being cut away from the covering to finish the utensil for use.

Antler Implements. Deer antlers and fragments of antler, worked and unworked, occur in all shell heaps and pits. When whole antlers are found, they usually show at the base the marks of the axe or other implement used

to detach them from the skull. Cut antler prongs, prongs broken from the main shaft and others partly hollowed and sharpened show the process of manufacture of antler arrow points. These are characteristic of this area and are usually conical in shape, hollowed to receive the shaft, and with one or more barbs; not infrequently, however, they are diamond-shaped in cross section. The shaft fitted into the hollow socket as in the case of the conical bone arrow points. A large number were found in and among the bones of human skeletons in a grave at the Burial Ridge, Tottenville, Staten Island.

Cylinders, neatly cut and worked all over, or cylindrical tines made of deer antler only cut and rounded at the ends, are not infrequent, and were probably used as flaking tools in making and finishing arrow points by pressure. One broken cylinder or pin, found on the Bowman's Brook site, Mariner's Harbor, Staten Island, had a rounded, neatly carved head. This specimen, however, seems to be unique.

Pottery stamps, perhaps of antler or bone, but which may be of wood, seem to have been used, judging by the decorations of many pottery sherds. A pottery stamp, carved from antler, was found slightly east of this region, at Dosoris, Glen Cove, Long Island, by Mr. M. R. Harrington, and is now in the Museum collection.

TRADE ARTICLES.

In spite of the frequent mention by old writers of barter of European for Indian goods, the amount of trade material found is small indeed. While it is abundant in the Iroquoian area, all that has ever been found here consists of a few round-socketed iron tomahawks, iron hoes, brass or copper arrow points of various styles, a little porcelain, a few glass beads, Venetian and plain, and some old pipes, notably those stamped "R. Tippet" on the bowl. All these articles are very rare here, and for this no adequate explanation can be given.

RÉSUMÉ.

This area was inhabited during historic times by the following tribes:¹

A. The Lenni Lenapé, or Delaware, ranging from the Raritan River, including Staten Island, to Saugerties on the west bank of the Hudson.

¹ On the map (Fig. 18), these tribes are shown together with the Long Island and other neighboring tribes as indicated by Beauchamp in the map accompanying his "Aboriginal Occupation of New York," New York State Museum, Bulletin 32, Albany, 1900.

Raritan or Assanhican.

Hackensack.

Tappan.

Aquakanonk.

Haverstraw.

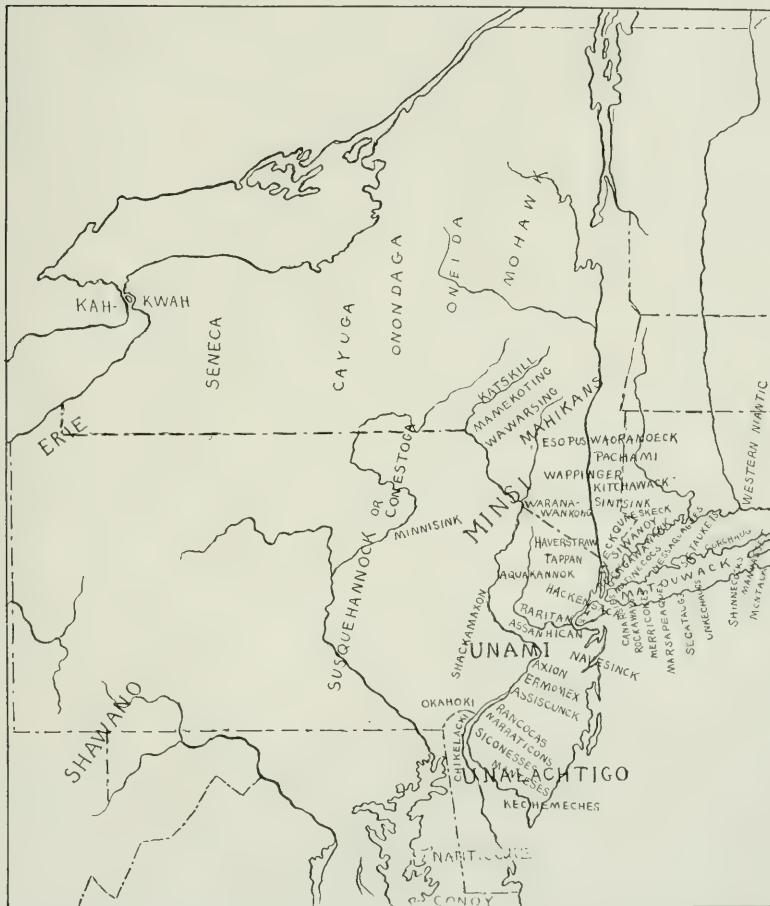


FIG. 18. MAP SHOWING THE LOCATION OF THE NEW YORK COASTAL ALGONKIN AND THEIR NEIGHBORS.

Waranawankong.

B. The Wappinger Confederacy ranging along the east bank of the Hudson, eastward to Connecticut, from Manhattan Island.

Rechgawawank or Manhattan.

Siwanoy.

Weekquaskeek.

Wappinger.

C. Montauk or Matouwack Confederacy.

Canarsie.

These tribes were surrounded on all sides by neighbors of the same stock, who differed somewhat in their language and culture. On the south and west, lay the Lenni Lenapé, or Delaware proper; on the north, the Manhattan, and on the east the New England tribes. Almost without exception, these natives were displaced early in the history of this country, and have been long since expatriated or exterminated. A very few mixed bloods may yet be found on Staten Island, Long Island and in Westchester County, but their percentage of Indian blood is extremely low.

The remains of aboriginal life now to be found, consist of shell heaps, occurring at every convenient point along the coast, on the rivers, and, more rarely, inland; shell, refuse, and fire pits; camp, village and burial sites; and rock and cave shelters. With one prominent exception,¹ few or no relics have been found in graves. The typical interment was of the flexed variety, but bone burials are not infrequent.

Dog skeletons complete and intact, bearing the appearance of having been laid out, are sometimes found buried in separate graves. Some writers have supposed that these individual dog burials are the remains of "white dog feasts" or kindred practices, because the Iroquois even up to the present day hold such ceremonies. The white dog is entirely cremated by the Iroquois, and so far as we have been able to find out, there is no record of such occurrences among the coastal Algonkin; hence, there seems no reason to attribute this custom to them since other Iroquois traits were so infrequent. It seems more probable that such burials are simply those of pet animals, interred as we to-day honor a faithful dog.

Occasionally, the skeletons of dogs and rarely of other animals have been found in graves associated with human bones. The finding of arrow-heads among the ribs of some of these, and other circumstances, seem to point to a practice of killing a favorite animal on the death of its owner to accompany or protect the spirit of its master on the journey to the hereafter.

From their appearance and position, many graves seem to indicate that the dead may sometimes have been buried under the lodge, especially in time of winter, when the ground outside was frozen too hard to permit grave digging. Others under the same circumstances seem to have been buried in refuse pits. The remains further indicate that "feasts of the dead," were

¹ Burial Ridge, Tottenville, Staten Island.

also held at the time of the interment, judging by the quantity of oyster shells and animal bones in and near the graves. Some graves have rows or layers of oyster shells, with the sharp cutting edge upward, placed above the bodies as if to prevent wild animals from disinterring and devouring the dead.

An interesting fact, brought to light by the rock-shelter work of Messrs. Schrabisch and Harrington in their explorations in New Jersey and Westchester County, New York, is that in the lowest and oldest refuse layers of these shelters pottery does not occur. It would be ill advised to infer from this that the earliest occupants were peoples of another culture from the surrounding village dwellers, as the other artifacts found are quite similar to the implements of the latter. Many reasons for this lack of pottery, such as the more easy transportation of vessels of bark or wood through the mountains and hills, suggest themselves, though they are more or less nullified by the presence of pottery in the upper layers. The upper layer, however, may have been made during the period when the natives were being displaced by Europeans and at the same time subjected to Iroquoian raids, when the villages would naturally be abandoned from time to time, for refuge among the cliffs and caves of the mountain fastnesses.

It has been suggested that the rock and cave shelters are remains of an older occupation by people with or without the same culture as the later known savages. The nature of the finds does not support this view, for the specimens obtained are often of as good workmanship as the best to be found in the villages and cemeteries of the latter, while pottery, on the other hand, occurs on the oldest known Algonkian sites. It seems most probable to the writer that, like the shell heaps, the rock and cave shelters form but a component part, or phase, of the local culture, perhaps a little specialized from usage and environment, but contemporary with the villages, shell heaps and cemeteries of the lowlands.

Mounds and earthworks do not occur in the region under consideration, nor does it appear that most of the Indian villages here were fortified, unless they were slightly stockaded. A number of instances of this are known historically, however, and a few earthworks occur just beyond this area.¹

The remains found do not bear any appearance of very great geological antiquity. In a few instances, rock-shelters, shell heaps and village sites seem to possess a relative antiquity; but the oldest known remains, in every case, may be placed as Algonkian with considerable certainty. No paleoliths have been reported, and it would seem from the comparative lack of antiquity of the remains that the natives could not have lived in this region for many centuries before the advent of the whites. The accounts of con-

¹ An earthwork at Croton Point on the Hudson has been excavated by Mr. M. R. Harrington for the American Museum.

temporary writers prove conclusively that these archaeological remains, if not those left by Indians found here by the early Dutch and English settlers, must have been from people of very similar culture. In culture, the local Indians were not as high as the Iroquois, nor perhaps as the Lenapé or Delaware proper from whom they sprang; but they compare very favorably with the New England tribes. Absence and scarcity of certain artifacts such as steatite vessels, the long stone pestle, the gouge, adze and plummet, and the abundance and character of bone and pottery articles show them to have been intermediate in character between the Lenapé on the south and west, and the New England tribes on the east and north; and consultations of the old European contemporaries show that this was the case linguistically as well as culturally. Examination of the remains also shows that the influence of the Lenapé on the west, and of the New England peoples on the east, was most strongly felt near their respective borders. Iroquoian influence was strong, as evinced by the pottery, and there is also documentary evidence to this effect. Finally, as is frequent throughout most of eastern North America, the archaeological remains may be definitely placed as belonging to the native Indian tribes who held the country at the time of its discovery or to their immediate ancestors.

Historical Notes on the Indians of Manhattan.¹

Historical references to the Indians who occupied this territory in the early days are very confusing and contradictory. There seems to be a great deal of trouble in the use of the word Manhattan. Van der Donck in 1633 classified the Indians of this section by language, and said, "Four distinct languages—namely Manhattan, Minqua, Savanos and Wappanoos"—are spoken by Indians. "With the Manhattans we include those who live in the neighboring places along the North River, on Long Island, and at the Neversinks."² It is probable that "it was....this classification by dialect that led the Dutch to the adoption of the generic title of Manhattans as the name of the people among whom they made settlements."³ De Laet wrote that "on the east side, on the mainland, dwell the Manhattans," and in 1632 Wassenaer adds that they are "a bad race of savages, who have always been unfriendly to our people" and that "on the west side are the Sanhikans, who are the deadly enemies of the Manhattans."⁴ "When Hudson returned from his trip up the River which now

¹ First paragraph by James K. Finch.

² Wilson, *Memorial History of N. Y.*, Vol. I, p. 34.

³ *Ibid.*, p. 49.

⁴ *Ibid.*, p. 34.

bears his name, he was attacked by Indians in birch or dug-out (?) canoes at the mouth of Spuyten Duyvil Creek. These Indians were a sub-tribe of the Wappingers or Wapanachki called the Reckgawawances.”¹ This name seems to have been given to the Indians who inhabited Manhattan Island, while the term Manhattans as already stated was a classification of dialect only. Ruttenber says that the Reckgawawances were named after their chief Rechgwac;² and the name also seems to have been applied to part of the island for Riker says that,— “The Indians still [in 1669] laid claim to portions of the Harlem lands, . . . one of the tracts being their old and favorite haunt Rechewanis, or Montagne’s Point. The chief claimant was Rechewack, the old Sachem and proprietor of Wiekquaskeek, who, as far back as 1639, had been a party to the sale of Ranachqua and Kaxkeek.”³

Not much is known of their habits and customs beyond what has been inferred from the relics to be seen in this exhibit, but Mr. Bolton writes:

“We are not without detailed description of our primeval predecessors upon the island of Manhattan, for the Hollanders recorded many of their impressions of aboriginal peculiarities. We may assume that they possessed the usual characteristics, the stolid demeanor, the crafty methods, and revengeful nature of the Indian, all of which were exhibited in their dealings with the White intruders. These local bands appear to have had, in addition, some particular local habits. They painted their faces with red, blue, and yellow pigments, to such a distortion of their features, that, as one sententious Dominie expressed it, ‘They look like the devil himself.’ Their dependence on supplies of game and fish caused their removal from one place to another, semi-annually, and we read of their removal to a summer ‘hunting-ground’ in Westchester, whence the band returned to ‘Wickers Creek,’ for the winter shelter, and to resume their occupation of oystering and fishing in the Harlem and Spuyten Duyvil Creek.

“As for dress, ‘They go,’ said Juet, ‘in deerskins, loose well-dressed, some in mantles of feathers, and some in skins of divers sorts of good furres. They had red copper tobacco pipes, and other things of copper they doe weare about their neckes.’

“No copper objects have been found in upper Manhattan, probably their metallic stock was bartered away with the early colonists, for in 1625, De Laet described their use of ‘Stone pipes for smoking tobacco.’

“As regards their food, the evident abundance and size of the local oyster shells shows that they possessed in them a ready source of subsistence. As soon as Hudson’s ship reached the neighborhood of Greenwich, where the

¹ *Ibid.*, p. 46.

² Ruttenber, *op. cit.*, p. 78.

³ *History of Harlem*, p. 287.

Indian Village Sappokanikan was located, the natives 'brought great store of very good oysters aboard, which we bought for trifles.' De Laet (1625) says, 'their food is maize, crushed fine and baked in cakes, with fish, birds and wild game.' Van der Donck and others wrote in 1649:

Their fare, or food, is poor and gross, for they drink water, having no other beverage; they eat the flesh of all sorts of game that the country supplies, even badgers, dogs, eagles and similar trash, which Christians in no way regard; these they cook and use uncleansed and undressed.

Moreover, all sorts of fish; likewise, snakes, frogs and such like, which they usually cook with the offals and entrails.

They know also, how to preserve fish and meete for the winter, in order then to cook them with Indian meal.

They make their bread, but of very indifferent quality, of maize, which they also cook whole, or broken in wooden mortars.

The women likewise perform this labor, and make a apa or porridge called by some, Sapsis, by other, Duundare, which is their daily food, they mix this also thoroughly with little beans, of different colors, raised by themselves; this is esteemed by them rather as a dainty than as a daily dish.

"Their weapons were, of course, the usual aboriginal bow, arrow, spear, club and tomahawk, though but a few years later, they had acquired from the settlers enough fire-arms to become exceedingly expert in their use. 'Now, those residing near, or trading considerably with the Christians, make use of fire-locks and hatchets, which they obtain in barter. They are excessively fond of guns; spare no expense on them, and are so expert with them, that in this respect they excell many Christians.' Many of their discarded neolithic weapons have been found, and these exhibit a wide variety of material and workmanship, indicating considerable acquisitions from other tribes and localities. Their household utensils included 'mats and wooden dishes,' and Juet refers to their 'pots of earth to dresse their meats in,' and speaks also of the women bringing 'hempe.' The character of the grass mats which the women wove is to be seen in the imprints made with such material upon the outer surface of some of the local pottery. They also made the grass baskets, often referred to in early records, as 'napsas.' The pots of earth were the large earthenware vessels made by the Indian women, on the decorations of the rims and upper portions of which these poor creatures expended all their ingenuity and sense of art.

"Of these objects, there remain a number of interesting examples discovered in upper Manhattan, the most complete, and at the same time, most artistic, being the fine Iroquoian vessel discovered by Mr. W. L. Calver, on the south side of 214th Street, about 100 feet east of 10th Avenue, in the fall of 1906. The large vases found in broken condition in the cave at Cold Spring, are of the cruder and therefore, earlier design of the original

Algonkian inhabitants, who at a later period, probably by barter, and perhaps by inter-marriage, acquired or learned the art of Iroquoian design and decoration.

"Of the period during which the race occupied this locality, we can only make conjectures. The extent and character of the shell heaps at Cold Spring and the pits and burials at Seaman Avenue, certainly indicate a settlement of large numbers or of considerable age. The ceremonial pits at 212th Street and certain remains of aboriginal feasting, such as fish bones and oyster shells, appeared to exist at a level below the graves of the slaves of the settlers, buried at that place.

"While these conjectures may carry back the period of occupancy to antiquity, the tools and weapons are all of the modern order, and no objects of true paleolithic character have been discovered, so that we have as yet nothing definitely reaching back into the remote ages of the most primitive mankind, although on Hunt's Point in the Bronx, at no great distance away from our island, a very interesting rude ax and a hammer were discovered by Mr. Calver in a gravel-pit, near the old Hunt burying-ground."

LOCATION OF ARCHÆOLOGICAL REMAINS ON MANHATTAN ISLAND.¹

The first field work done on Manhattan Island is of very recent date. Doubtless many articles of Indian manufacture and evidences of Indian occupation were found as the city grew up from its first settlement at Fort Amsterdam, but of these specimens we have very few records. The first specimens found which have been preserved, to the knowledge of those now interested in the subject, were found in 1855, and consisted of a deposit of Indian arrow-points found in Harlem during excavation for a cellar on Avenue A, between 120th and 121st Streets. Some of these are spoken of by James Riker² as being in the author's cabinet. Riker also speaks of shell heaps near here.³ The next specimens preserved were found at Kingsbridge Road (now Broadway) and 220th Street in 1886, and are in the John Neafie collection at the Museum. These consist of an arrow point and a few bits of pottery. The next work was begun in 1889 by Mr. W. L. Calver of this city, and has led to the discovery of much valuable material which has been preserved.⁴

¹ By James K. Finch.

² History of Harlem (1881), footnote, p. 137.

³ Ibid., p. 366.

⁴ In the Spring of 1890 Mr. Edward Higaman Hall began his investigations and at about the same time Mr. Reginald P. Bolton entered the field of local research. In many instances these gentlemen and Mr. Calver collaborated with valuable results. In the preservation of the traces of Indian occupation of Manhattan Island the American Scenic and Historic Preservation Society (formed in 1895 under the presidency of the late Hon. Andrew H. Green, but now under that of Dr. George Frederick Kunz) has done much pioneer work.

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The following account of the work is taken mainly from Mr. Calver's note-book:

In the autumn of the year 1889, while exploring the heights of Bloomingdale (now called Cathedral Heights) for any relics that might have remained from the Battle of Harlem, Mr. Calver discovered one arrow point at 118th Street, east of Ninth Avenue, and immediately afterwards a circular hammer-stone. On a later trip to the same locality, he found a small grooved axe or tomahawk.¹ In February, 1890, while hunting for Revolutionary relics in the vicinity of Fort Washington, he made a trip to the northern part of the Island in search of British regimental buttons, many of which were said to have been found in that vicinity. There he met an old acquaintance, Mr. John Pearce, a policeman then on duty there, by whom he was introduced to Mr. James McGuey, a youth residing in the vicinity of 198th Street and Kingsbridge Road. To Mr. Calver, Mr. McGuey presented several relics found by himself on camp sites and made an appointment to meet him early in March to explore for Indian remains. The same day, Mr. Pearce took Mr. Calver to be introduced to Mr. Thomas Reeve who resided near Kingsbridge Road and Isham Avenue, and, while crossing the orchard at Academy Street and Seaman Avenue, Mr. Calver saw that the ground was thickly strewn with shells which afterwards proved to be of Indian origin.

The first Sunday in March, Messrs. Calver and McGuey explored this part of the Island for Indian remains. At the junction of Academy Street and Prescott Avenue, they found an Indian potsherd whose importance Mr. McGuey seemed to realize, for, a week later, Mr. Calver met him again and was presented by him with a number of fragments of Indian ware. He assured Mr. Calver that he had found it by digging in an Indian graveyard. The two men dug again at this place, now known as "the Knoll," and found more pottery. They then went to Cold Spring, a point on the extreme northern end of the Island, and in a shell heap there they found more Indian work. Mr. Alexander C. Chenoweth, an engineer, then on the Croton Aqueduct, hearing of these discoveries, obtained a permit from the property owners and began to explore "the Knoll" for Indian remains. Having finished here, he went to Cold Spring and made some further discoveries. All his specimens were purchased in 1894 by the Museum, and some of them are now on exhibition.

Since this time, several interesting relics have been found and, as the work of grading streets and other excavation at this part of the Island are carried on, more relics will probably come to light. An account of the recent finds will be found in another part of this Guide, the time of this writing having been 1904.

¹ The writer found an arrowhead on South Field, in front of Columbia University Library, on September 30, 1904.

The only Indian remains left on the Island, so far as known to the writer, are situated at the extreme northern end at Inwood and Cold Spring. They consist of the co-called shell heaps or refuse piles from Indian camps, and three rock-shelters at Cold Spring. But we have evidence to show that this was not the only part of the Island occupied by the Indians. Mrs. Lamb¹ says that the Dutch found a large shell heap on the west shore of Fresh Water pond, a small pond, mostly swamp, which was bounded by the present Bowery, Elm, Canal and Pearl Streets, and which they named Kalch-Hook or shell-point. In course of time, this was abbreviated to Kalch or Collect and was applied to the pond itself.² This shell heap must have been the accumulation of quite a village, for Mrs. Jno. K. Van Rensselaer³ speaks of a castle called Catiemuts overlooking a small pond near Canal Street, and says that the neighborhood was called Shell Point. Hemstreet refers to the same castle as being on a hill "close by the present Chatham Square," and says that it had once been an "Indian lookout."⁴ Excavations at Pearl Street are said to have reached old shell banks. "The Memorial History of New York"⁵ says that a hill near Chatham Square was called Warpoes, which meant literally a "small hill."⁶ According to the same authority, "Corlear's Hoeck was called Naig-ia-nac, literally 'sand-lands.' It may, however, have been the name of the Indian village which stood there, and was in temporary occupation." This is the only reference we have to this village, but there are references to another on the lower end of the Island. Janvier⁷ says that there was an Indian settlement as late as 1661 at Sappokanican near the present Gansevoort Market. According to Judge Benson,⁸ Sapokanican was the Indian name for the point afterwards known as Greenwich. "In the Dutch records references are made to the Indian village of Sappokanican; and this name....was applied for more than a century to the region which came to be known as Greenwich in the later, English, times. The Indian village probably was near the site of the present Gansevoort Market; but the name seems to have been applied to the whole region lying between the North River and the stream called the Manetta Water or Bestavaar's Kill."⁹ Benton says that the name of the

¹ History of New York City, p. 36.

² Mr. Edward Hagaman Hall, however, derives the name from "Kolk" or "Kolch" a word still in use in Holland and applied to portions of a canal or inclosure of water. The word also means "pit hole", which aptly describes the Collect Pond.

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³ Goede-Vrouw of Manahata, p. 39.

⁴ Hemstreet, Nooks and Corners of Old New York, p. 46.

⁵ Bulletin, N. Y. State Museum, Vol. 7, No. 32, p. 107, Feb., 1900.

⁶ James G. Wilson, op. cit., p. 52.

⁷ Evolution of New York.

⁸ N. Y. Historical Society Collection, S. II, Vol. II, Pt. I, p. 84, 1848.

⁹ Thos. A. Janvier, In Old New York, pp. 85-86.

village was Lapinican.¹ Going back to the old Dutch records might lead to finding the actual names and other data regarding these places.

Most of the specimens found on Manhattan Island, as already stated, come from the northern part. We have a few from the central portion, however. There are the arrow-heads spoken of by Riker, and in Webster Free Library there is a fine specimen of a grooved stone axe found at 77th Street and Avenue B. Mr. Calver has found an arrow-head at 81st Street and Hudson River and specimens from the site of Columbia College have been recorded.

Doubtless the northern part of the Island was inhabited for the longer period; but it is probable that all along the shore, wherever one of the many springs or small brooks, shown on old maps, emptied into the Hudson or East River, there were small, temporary Indian camps. It is likely that these camps were used only in summer, while the primitive occupant of Manhattan retreated to the more protected part of the Island, as at Inwood and Cold Spring, during the winter. Or it may be possible that, as Ruttenber² states, the villages on Manhattan Island were only occupied when the Indians were on hunting and fishing excursions, while their permanent villages were on the mainland. Bolton,³ however, says their principal settlement was on Manhattan Island.

Fort Washington Point. There is a small deposit of shells, on the southern edge of the point, in which the writer found some small pieces of pottery and a few flint chips, thus proving its Indian origin. This was probably a summer camp, as it was too exposed for winter use.

The Knoll. "The Knoll" was the name applied to a small rise of land, at the southwest corner of Dyckman Street and Sherman Avenue, which ran out into Sherman Creek from the eastern edge of the hill at that place. As already stated, Messrs. Calver and McGuey found potsherds here; then Mr. Chenoweth obtained permission of the property owners to make excavations. He found numerous fragments of arrow points and pottery in some refuse deposits from an Indian camp and also uncovered what were thought to have been "paved fireplaces." The newspapers of the time had accounts of the finds, with pictures of the pottery and other objects found.⁴ Mr. Chenoweth also uncovered a number of skeletons. It is stated that these graves were marked with rough headstones, and there are pieces of a coffin from here in the Terry collection in the American Museum, as are also a number of lead buttons found with one interment. Everything seems

¹ New York, p. 26.

² Indian Tribes of Hudson's River, p. 78.

³ History of Westchester County, p. 25.

⁴ New York Herald, January 14, 1894; also Illustrated American, September 19, 1901.

to point to these as being burials of early settlers, but Mr. Chenoweth holds that they are Indian. Several of the skeletons have been preserved in the Museum. A parallel condition to this at the Knoll was found at 211th Street and will be spoken of later. The Knoll site had undoubtedly been an ancient Indian camp. Probably Sherman Creek was open up to this point to Indian canoes.

Cold Spring. Cold Spring is situated at the extreme northern end of Manhattan Island on the southern shore of Spuyten Duyvil Creek. The Indian remains consist of three rock-shelters and three refuse heaps. The rock-shelter is a formation where the overhanging rocks form a small cave or shelter which the Indians used as a dwelling place. All their rubbish, such as oyster shells, broken pottery and broken arrow heads, were dumped near by, forming the so-called shell heaps. Messrs. Calver and McGuey explored the shell heaps; but Mr. Chenoweth was the first to suspect the existence of the shelters. There is only one which is likely to have been used as a dwelling place, the others being places where food was stored or shelters for fires used in cooking. These shelters face east, and are at the foot of the hill (formerly called Cock Hill) which forms the most northern part of Manhattan Island. The largest one was formed by several of the rocks breaking off the cliffs above and falling in such a manner that, by digging out some of the earth from beneath them, the Indians could make a small shelter. Probably it was occupied by one family, while the others lived in bark wigwams near by.¹ Another of the shelters is simply an excavation under the end of a huge fragment which also dropped from the cliffs above, and the third is a large crevice in the foot of these cliffs. When Mr. Chenoweth first explored them, all these shelters were completely filled with earth which had gradually worked its way in since their occupation, and much credit is due him for suspecting their presence. In them he found fragments of pottery and stone implements, together with the bones of turkey and deer. The largest of the refuse heaps is situated on a rise directly in front of these shelters. It consists of a layer of shells, in places several inches thick, found under a layer of fine loam, a black earth which has been deposited since the shells were scattered over the original sandy yellow soil. The sheltered position of this place made it an especially desirable camp site. The hills to the south and west formed a protection to the camp from winds, and by Spuyten Duyvil Creek access could be had to either Hudson or East River; while the Cold Spring, from which the place takes its name, furnished an abundant supply of fresh water.

¹ Memorial History of New York, Vol. I, p. 33, for picture of houses, and p. 39 for description.

Inwood Station Site. At the foot of Dyckman Street and Hudson River, there existed a large deposit of shells, most of which were removed when the rocks on which they lay were blasted away for grading the street. A few arrow points and bits of pottery, as well as several Revolutionary objects, were found here. Part of the deposit is still left on the northern shore of the small bay just below Inwood station. There are photographs of this deposit in the Museum.

Harlem Ship Canal. Formerly at 220th Street and Kingsbridge Road was a large deposit of shells on the westerly side of the road. This was destroyed when the ship canal was put through. As with the Inwood Station site, no systematic examination of this place was ever made. Mr. John Neafie found some potsherds here in 1886, and Mr. Chenoweth also has some potsherds from here.¹ Mr. Calver says that this was a large deposit, and that the peculiar thing about it was that the shells were so wedged and packed together that a pick would hardly penetrate them. They lay on the bare rock surface in cracks in the rock.

Harlem River Deposit. Mr. Calver says, "Extending from 209th Street to 211th Street on the west bank of the Harlem River and almost on a line with Ninth Avenue was another large deposit of oyster shells lying just beneath the top soil of the field. These shells had nearly all been disturbed by the plow and are interesting only for their color, which was red. Pieces of horn of deer and split bones of the same animal were common among the shells; but, in spite of the apparent antiquity of the deposit, there were, even in the lowest strata of it, some small fragments of glass which proved that either the whole mass had been disturbed or else the shells had been left during the historic period. There are several stone sinkers and hammerstones from this spot in Mr. Calver's collection and at the Museum.

Isham's Garden. This is a large garden about on the line of Isham Street and Seaman Avenue. The soil is white with small fragments of shells. A number of arrow points, flint chips, hammerstones, sinkers and a few bits of pottery have been found here. Mr. Calver has found several shell pockets with small deposits of pottery, etc., on the hill to the south of this garden.

Academy Street Garden. This is a small garden between Academy and Hawthorne Streets, running through from Seaman Avenue to Cooper Street. It was a British camp site during the Revolution, and a number of buttons, gun-flints and bullets have been found there as well as numerous Indian remains. It seems to have been the workshop for a red jasper-like stone of which numerous chips but no finished implements have been found. The shells at this point were first noticed by Mr. Calver in 1890. They may not all be of Indian origin, as some may be due to soldiers.

¹ John Neafie collection, 20-2558; Chenoweth, 20-3498.

Dog Burials found in 1895. In January, 1895, Mr. Calver found two interesting "dog burials." The first burial was unearthed at the summit of a ridge of soft earth at 209th Street, near the Harlem River. The ridge, which was about twelve feet high, had been partly cut away for the grading of Ninth Avenue. It was at the highest part of the hillock that a pocket of oyster and clam shells was noticed, from which a few fragments of Indian pottery which lay on the face of the bank had evidently fallen. The shells, upon inspection, were found to have served as a covering for the skeleton of a dog or wolf. Another burial was found on May 18th within fifty yards of the first burial. It had been covered with shells just as the first one, but had been disturbed by workmen. Mr. Calver says: "The two canine burials were situated at a point just without the borders of the Harlem River shell heap and were distinct from it. The shells were found to be matched, hence it was concluded that they were thrown in unopened or eaten on the spot. As the skeletons were intact and the bones uninjured, all probability of the animals having been eaten is disposed of." These burials are common in this vicinity. No satisfactory explanation of them has been given; but Mr. Calver thinks they were for some religious purpose, and suggests a relation to the "White Dog Feast" of the Onondaga of this State.¹ It is certain that the pockets were in many cases used as fireplaces.

Shell Pockets at 211th Street. In March, 1903, there was considerable excitement over the reported discovery of an Indian graveyard at 211th Street.² The graveyard proved to have been that of some slaves, and was situated on the western end of the rise between 210th and 211 Streets, on the eastern end of which is the old Neagle Burying Ground. This discovery was interesting because under the negro graves several shell pockets of undoubtedly Indian origin came to light. The workmen, in grading Tenth Avenue, cut into this hill to obtain material for filling, and uncovered the graves and pockets. It seems almost certain that the deposits were made some time ago; then the wind blew the sand over the deposits to a depth of four or five feet, and negroes later used this place as a burial ground. In support of this theory is the fact that the pockets were four or five feet under the surface, that the soil above showed no signs of having been disturbed, and that this rise is put down on the Government maps of this section as a sand dune.³ During the summer of 1904, Mr. Calver with Messrs. Hall and Bolton uncovered nine more pockets to the southwest of the graveyard.⁴ These pockets all seem to have been of the same period as the others, and

¹ N. Y. Herald, May 26, 1895.

² Evening Telegram, March 14, 1903.

³ New York Geologic Folio.

⁴ New York Tribune, Oct. 30, 1904, and New York Sun, Dec. 14, 1904.

all appear to have been on the original ground surface, although those farther up the hill were some four feet under the present surface. In one of these pockets, was found the complete skeleton of a dog¹; in another, a turtle shell; two others contained complete snake skeletons; while a fifth held the fragments of a small pottery vessel. The pockets were small, being about three feet in diameter and of equal depth, showing no signs of having first been used as fire places and then filled up, though charcoal was scattered among the shells. Almost all the relics from Van Cortlandt Park were found by Mr. James in pockets similar to these.

During Indian troubles in 1675, the Wickquaskeeks at Ann's Hook, now Pelham Neck were told "to remove within a fortnight to their usual winter quarters within Hellgate upon this island." Riker says, "This winter retreat was either the woodlands between Harlem Plains and Kingsbridge, at that date still claimed by these Indians as hunting grounds, or Rechawanes and adjoining lands on the Bay of Hellgate, as the words 'within Hellgate' would strictly mean, and which, by the immense shell-beds found there formerly, is proved to have been a favorite Indian resort."² A little later the Indians asked to be allowed to return to their maize lands on Manhattan Island and the Governor said that they, "if they desire it, be admitted with their wives and children, to plant upon this Island, but nowhere else, if they remove; and that it be upon the north point of the Island near Spuyten Duyvel."³

Mrs. Mary A. Bolton Post, in writing to the editor of "The Evening Post," June 19th of the year of the opening of the Harlem Ship Canal (1895), speaks of some Indians who were allowed to camp on the south side of Spuyten Duyvil Creek on the Bolton property in 1817. Ruttenber says that the Reckgawawanos had their principal village at Yonkers, but that on Berrien's Neck (Spuyten Duyvil Hill) was situated their castle or fort called Nipinichsen. This fort was protected by a strong stockade and commanded the romantic scenery of the Papirinimen, or Spuyten Duyvil Creek, and the Mahicanituk (Hudson River), the junction of which was called the Shorackappock. It was from this castle that the Indians came who attacked Hudson on his return down the river.⁴ Some small shell deposits occur on Spuyten Duyvil Hill, but as yet this "castile" has not been definitely located. The village site at Yonkers, according to Mr. James, is now covered by buildings; but several relics found near the site years ago are now in the Manor Hall at that place (1904).

¹ All that could be saved of this skeleton has been presented to the Museum by Mr. Edward Hagaman Hall.

² History of Harlem, p. 366.

³ Ibid., p. 369.

⁴ Ruttenber, pp. 77-78.

Judging from these references, we might conclude that the territory occupied by the tribe commonly known as Manhattans included Manhattan Island and that part of the mainland which is west of the Bronx River north to Yonkers, and that these Indians were a sub-tribe of the Wappinger division of the Mahican.

Indian Burials.

Indian Burials. Notwithstanding all the efforts of various collectors, the first Indian burials to be discovered on the Island were due to the activities of Messrs. Bolton and Calver in 1904. The improvement of Seaman Avenue, Upper Manhattan, at that time, uncovered many relics of the long extinct Indian inhabitants among which Mr. Bolton saw unmistakable signs of Indian graves. To quote from this gentleman: "It thus became evident that there were human interments in the vicinity, and in August, 1907, the first burial was discovered under a shell pit in Corbett's garden. The grading process had been extended only about eighteen inches below the sod, but had sufficed to destroy the jaw of the skeleton which extended upwards, as did also the foot bones. The bones lay in and upon a close mass of oyster shells, some of which were unopened, the skeleton reclined on its right side, facing west. The arms were flexed and crossed, the knees bent and the head thrown back. No traces of weapons were found, nor were there any other objects found, save a fragment of an animal bone.

"The location and position led to further exploration, which, early in 1908, led to still more interesting discoveries. Sunday, March 22nd, being the first day in the field for exploration for the season for 1908, W. L. Calver and the writer met at Seaman Avenue and Hawthorne Street, Manhattan, to discuss plans for further excavations on this Indian village site. The rains of the winter 1907-8 had washed the west bank where the layer of oyster shells and black dirt lay along the hill, and a patch of red burnt earth was observed, which on digging out, disclosed a fireplace, evidently of the period of the Revolution, having some large burnt stones, ashes, wood charcoal, brick, broken rum bottles, a wine glass nearly complete, a large open clasp-knife with bone handle, a hoop-iron pot-hook, various forged head nails and a curious folding corkscrew. Gold buttons of Revolutionary pattern and an officer's silver button of the Royal Mariners, together with pewter buttons of the 17th Regiment disclosed who had occupied the spot.

"At one part of this fireplace, we came upon a pocket of oyster shells, evidently Indian, about two feet deep, and on removing some of these, had the good fortune to uncover a human thigh-bone. We worked carefully

into the shells and under the pocket, gradually disclosing the complete remains of a full-grown man (Fig. 19) lying on its right side, feet to the north, head facing east, knees doubled up, the left arm extended down through the thighs. The feet had been within the area of the hole in which the Revolutionary fireplace had been made, and only one or two foot bones were found. At a later period other foot bones were found on the opposite side of the Revolutionary fireplace, evidently having been displaced in its construction. The right arm was flexed, and the hand was under the head, the latter was



FIG. 19. INDIAN BURIAL, MANHATTAN.

intact and every tooth was in place. Shells had been packed over the body, and some around it. We were much puzzled by a number of human bones, lying compactly together by the skeleton, in a position that would have been in its lap had it been upright.

"We removed the skull, covered the remains, and on Sunday, March 29th, renewed the work. We went carefully to work upon the cluster of mixed bones in front of the large skeleton, and soon found them to be rather compactly arranged in a rectangular form about 14 by 26 inches, the long bones parallel. The vertebræ abruptly ended parallel with the head of the larger skeleton, and after working some time, we found a skull placed below, beneath the pile of bones in a vertical position, facing north, the

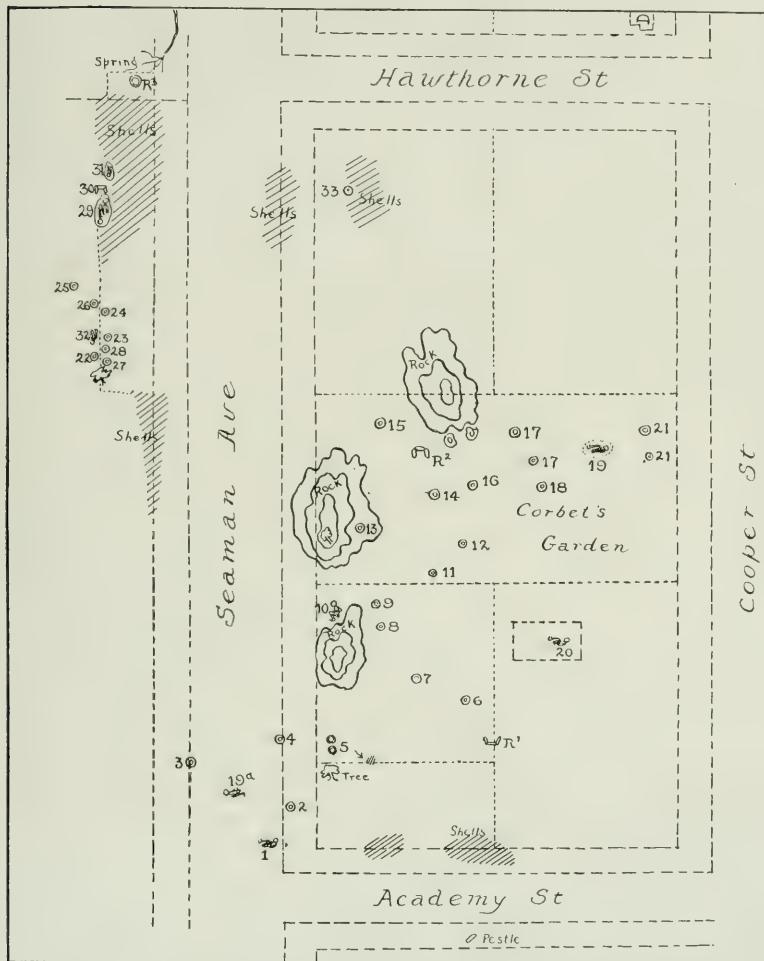


FIG. 20. LOCATION OF BURIALS, PITS AND SHELL-BEDS NEAR INWOOD.

1. Human remains.
2. Shell pit, deer antler.
3. Shell pit.
4. Shell pit, pottery.
5. Shell pits.
6. Shell pit, sturgeon below.
7. Shell pit, sturgeon scales.
- 8, 9. Shell pits.
10. Human remains.
11. Fire pit.
12. Shell pit.
13. Dog burial, puppy.
14. Shell pit.
15. Part of a jar.
16. Shell pit, fish and meat bones.
17. Shell pits.
18. Two dogs in shell pit.
19. Human skeleton, 1907.
- 19a. Female skeleton, 1908.
20. Human remains when house was built.
21. Small fire pits, Revolutionary.
22. Large shell pit.
23. Large shell pit.
24. Shell pit.
25. Dog burial.
- 26, 27, 28. Shell pits.
29. Two human skeletons, male and female.
30. Revolutionary fireplace "Royal Mariners" and "17th."
31. Skeleton and infant, female.
32. Skeleton (Chenoweth, 1908).
33. Revolutionary fireplace, 71st, officers' buttons.
- D. Dyckman dwelling.
- R¹, R². Revolutionary fireplaces.
- R³. Revolutionary well.

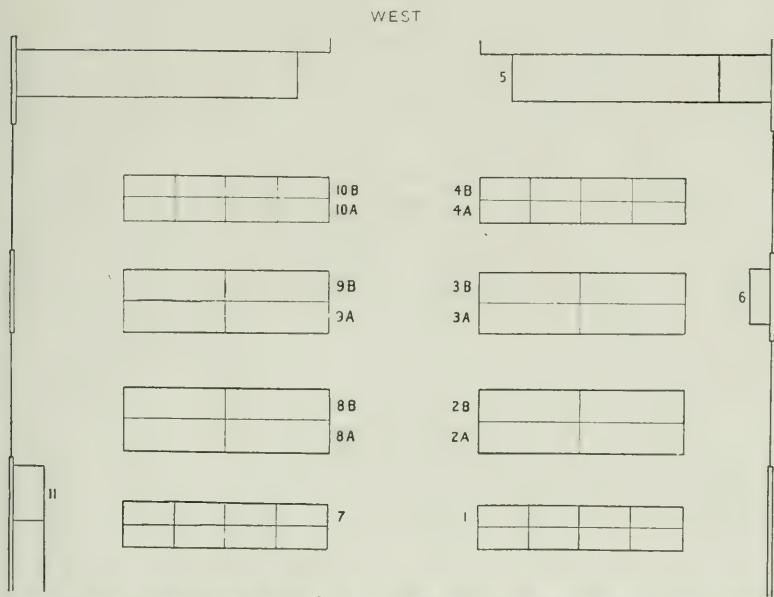
lower jaw of which was disengaged, and was placed sideways in front of the face. The back of the skull was broken in, and was black with marks of burning. The lower jaw was burned, and some of the teeth split by fire. The arm and leg bones were charred at the joints. Inside the skull was a burned toe bone. Some oyster shells were among the charred remains.

“A significant fact was that the right arm bones of the large skeleton were below the pile of burned bones. This feature, and the compact arrangement of the latter within the space in front of and at the same level as the large skeleton, seem to point strongly towards an intentional arrangement of these bones, in front of the large corpse and to indicate the simultaneous burial of the two bodies. On examination, the large skeleton proved to be that of an adult male, and the dismembered remains those of a female of about 35 years of age. No implements were found with the remains, but a part of a stone pestle and a rude celt lay under the sod among the oysters above the large skeleton.

“On Sunday, June 14, 1908, another burial was found about 20 feet north of the above. This burial consisted of an adult skeleton doubled up and its back much curved, and was apparently that of a female of mature age. Between the knees, the remains of a small infant were laid, the skull of the latter being fragmentary. The right hand of the adult was below the infant and the left hand around the throat. The skull was intact and had nearly all the teeth. One finger bone had grown together at the joint in a crooked position apparently due to disease. On lifting the ribs of the right side, an arrow-bead of flint fell out between the fourth and fifth bones. These skeletons lay about two and a half feet below the grass, and a pocket of oyster shells was over the head. The woman's remains lay within a space about 31 inches long by 50 inches wide, flat in the hard red sand bed facing east.

“Shortly after these remains were discovered, Mr. Chenoweth extended the excavation previously made by the explorers at the side of a large oyster shell pit in the same bank of sand, and uncovered a male skeleton of which he preserved the skull. Some small fragments of the skeleton were afterwards found by the writer on this spot. Contractors for the sewer in Seaman Avenue also uncovered the remains of a young female close to the position of several of the shell pits previously described.

“These interments have some curious features. The position of the remains facing east, sometimes west, the absence of weapons or other objects and the oyster shells packed with or above them are subjects for interesting discussion on which future finds may throw much light, as also upon the peculiar double burial and the burnt state of the female remains.”



FLOOR PLAN, WESTERN END OF THE HALL OF THE PLAINS INDIANS
(No. 102).

EXPLANATION OF CASE NUMBERS.

- 1 Mohegan and Delaware. Iroquois: Clothing; Weapons.
- 2A Prehistoric Life in Greater New York.
- 2B Prehistoric Manhattan Island.
- 3A Shinnecock Hills, Long Island.
- 3B Van Cortlandt Park. Long Island.
- 4A Iroquois: Corn Food; Household Utensils.
- 4B Iroquois: Transportation; Games; Ceremonial Objects; Wampum.
- 5 Iroquois Group.
- 6 Shell Heap.
- 7 Iroquois: False Face Society.
- 8A Westchester County.
- 8B Upper Hudson.
- 9A Kah Kwah and Erie Indians of New York State.
- 9B New York State. Articles of European Manufacture.
- 10A Pottery of Greater New York. Husk Face Society.
- 10B Bolton and Calver Collection.
- 11 Rock Shelter.

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THE PEARY ARCTIC CLUB EXHIBIT.
198
A great map painted on the floor shows Peary's route to the North Pole.

The American Museum Journal

VOL. IX

NOVEMBER, 1909

No. 7

ACHIEVEMENT IN POLAR EXPLORATION.

THE EXHIBIT OF THE PEARY ARCTIC CLUB.

FOR several years a record of Polar exploration has been on exhibition at the Museum in the east corridor immediately off the main foyer. Here, on two fifteen foot maps painted on segments of a globe fastened to the wall have been indicated the routes of Arctic and Antarctic expeditions.

On September 6 the Arctic map showed Nansen's farthest north, $86^{\circ} 14'$, reached in 1895, the Duke of the Abruzzi's (Cagni's) record, $86^{\circ} 33'$, made in 1900, and the northernmost point of all, $87^{\circ} 6'$, gained by Peary on April 26, 1906, but the routes went no nearer the Pole than these points, and from them stretched untraversed a region known to be more than two hundred miles wide on all sides of the Pole. On September 7, 1909, however, the red cord marking Peary's latest expedition spanned this remaining distance and a small flag floated at the center of the Arctic map to bear record to the larger American flag that was left on April 6, 1909, waving over the drifting ice where half the year is day and half is night.

This achievement, striven for by many men of many nations, marks an event in history. It closes a century of Arctic research, which century in turn was the culmination of a period of three centuries of exploration, if we count the exploits of whaling and sealing vessels and the early expeditions in search of a short water-route from western Europe to the Orient. Some facts have been discovered, some things proved not true, and the field is clear for new achievement along other lines, to the end that man may have a fairer understanding of the Universe in which he finds himself.

On the morning of October 12, an exhibition by the Peary Arctic Club was opened in the west wing of the Museum. The presentation

in this exhibit is unusually vivid. A half hour in the hall leaves one imbued with the feeling that he has actually traveled into the untenanted world around the North Pole. In the first place the exhibit is installed to give an effect of simplicity and severity, of much uninterrupted space, cold white surroundings and few objects. Those in charge were careful not to draw on the Museum's well-filled store houses of Arctic materials to such an extent as to destroy this atmosphere of severity. In the second place, because of the nature of the exhibit, everything speaks of adventure, of a difficult life, often of narrow escape and sometimes of disaster. This is true throughout, from the relic of the wrecked "Polaris" — a battered life boat that acts as a sign board just outside the entrance of the hall, to the view of the "Polaris" in Thank God Harbor — an immense canvas at the far end. Every object in the place seems to take on life as a representative of the daring work of some explorer.

In imagination we see the sleeping bags, displayed near the entrance, with their voluminous fur folds wrapped about the traveller shutting out the savage cold. We see the sledges not as mere dead frame-works of wood, but as active aids to man. In our awakened fancy, they have iced runners and, loaded with provisions, they cut deep trails as with dogs and drivers they pass always on into boundless ice and snow. The mounted dog, placed here to illustrate the Eskimo method of harnessing, brings to mind the long double-ranked teams, or the fan-shaped teams of eight as Peary drove them, dragging their burdened sledges, obeying word and whip day after day until too weak to help the expedition longer, except by giving their bodies as food to strengthen their fellows; while those who have read "Northward Over the Great Ice" recall Peary's tribute to the dogs of that journey, "Faithful, noble servitors.... My only consolation is the knowledge that like ourselves you did not suffer pain. The starvation was so gradual that when at last your lives went out.... the end was painless, as our own would have been had it not been for you." The mounted musk oxen, the many shaggy brown pelts wound about the pillars and the numerous skulls piled upon the floor, bring to mind forcefully the dependence of the explorer upon these animals for food. We get a more vivid understanding of the eagerness with which he has many a time searched the ground for musk ox tracks, and a more keen sympathy with his fear when he saw one or more of the great creatures, that his eyes blinded by



AN EXPLORER'S TRAIL LEFT AT THE ICE FOOT ON THE COAST OF GRINNELL LAND.

Greeley Expedition, May, 1882.



PRESSURE RIDGE IN NORTH POLAR ICE SHOWING ONE OF THE DIFFICULTIES OF ARCTIC TRAVEL.

Greeley Expedition, June, 1882.



PART OF THE NORTH POLAR REGIONS, SHOWING LINES OF APPROACH FROM
AMERICA AND EUROPE.

the incessant glare of the ice would give a false aim at the critical moment.

The realism of the exhibit is increased by the work of a newly-invented automatic stereopticon placed in a darkened alcove at the right of the hall. Through its display of pictures (uninterrupted from nine in the morning until five in the afternoon) the visitor is carried into the heart of the *Arctics*. He looks on boats and men, sledges and dogs, in action; he sees in these pictures the very mountains and icebergs, the self-same pressure ridges or "rafters" of ice and the leads of open water that the explorer whose hand held the camera saw in reality.

The central and most striking feature of the hall is a map painted in color on the floor over a space 30 feet by 50 feet in dimensions. It presents the approach to the Pole from North America only, the more frequently used of the two principal paths of exploration, namely: the route between Nova Zembla and Franz Josef Island, the direct course from Europe; and that through Davis Straight, Baffin Bay and Smith Sound, a lane of open water stretching northward between Greenland on the east and the line of Arctic American islands extending from Labrador to Ellesmere Land on the west. This map, therefore, does not show the route of Nansen, nor does it give that of the Duke of the Abruzzi, since both of these men made their approach from the Old World. It does mark the points reached by Markham and Parry in 1876, by Greeley in 1881 and by Lockwood and Brainard in 1882. It shows, at Cape Morris K. Jesup and Cape Bridgeman, the limit of exploration by Peary in 1900 and marks conspicuously the "farthest north" of the same explorer as reached April 26, 1906. The chief aim of the map, however, is to show the route of Peary's last or eighth expedition, financed by the Peary Arctic Club.

The story graphically spread out on the floor concerns more than a year's time and a distance of 800 geographic miles from Cape York northward to the Pole. The expedition started from Cape York August 1, traveling up Smith Sound. It reached Cape Alexander August 18 and Fort Conger September 2, the latter place being about 500 miles distant from the Pole. At Cape Sheridan the "Roosevelt" remained in winter quarters, as is indicated by the presence of a small model of the boat placed on the map at this point. On March 1, a few days before the sun rose above the horizon after the long Arctic night, the sledge journey began, a journey of more than 400 miles over drifting ice.



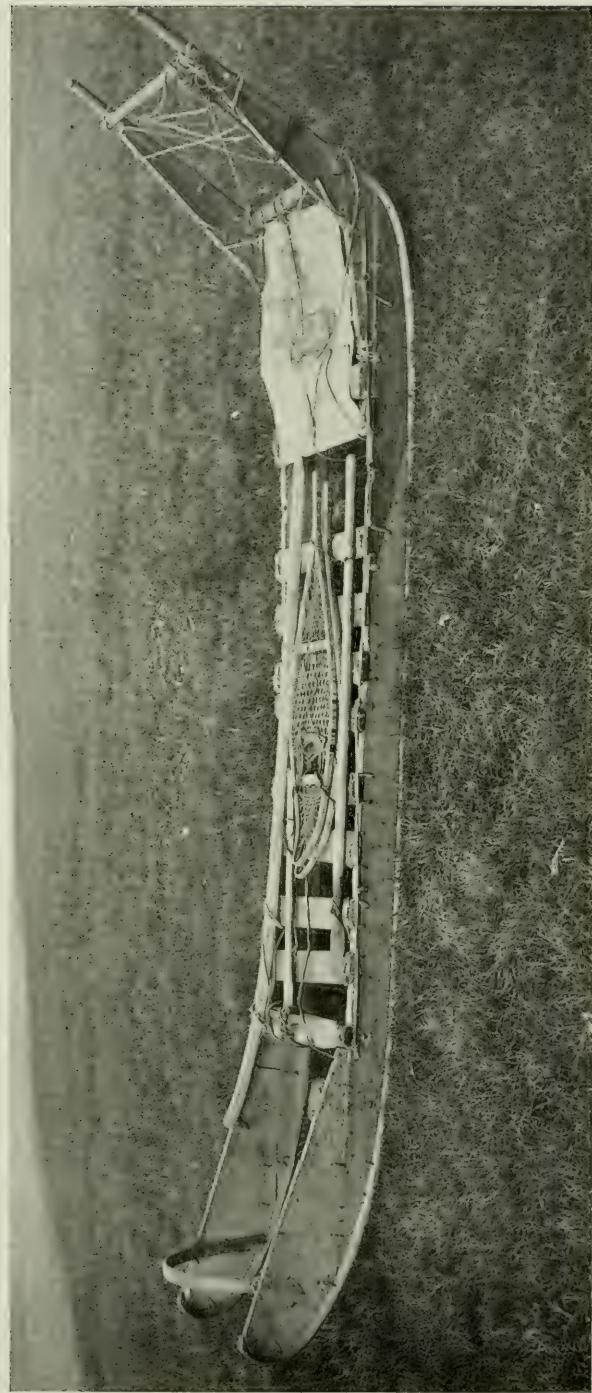
MUSK OX AND POLAR BEAR.

Peary Arctic Club Exhibit.

Through these 400 miles no living thing is to be found, for musk oxen and caribou range no farther north than Cape Morris K. Jesup, the northernmost land, while seal, walrus and narwhal are found only along the waters that margin the land.

The rest of the trip as traced shows a veritable "dash to the Pole." On March 11, 84° north was passed, and a week later, 85° north was reached, 300 miles from the Pole. By March 27 the expedition passed 87° north, and April 2, 88° north, only 120 miles from the Pole and farther north than any human being had ever before penetrated. Only four days later camp was made at the journey's end, and the American flag was flying at 90° north.

There is scarcely anything in the Peary Arctic Club's exhibit outside of this map that attracts more attention than a sledge on the west side



THE "MORRIS K. JESUP", A PEARY SLEDGE THAT REACHED THE NORTH POLE.

Taken on the lawn at the Museum after its return from the Arctic.

of the hall among piles of musk ox, caribou and walrus hides, crates of skulls and antlers, and the many other things that the "Roosevelt" brought south with her stowed away in every available place, even drying in the rigging. Though only a sledge, it seems deserving honor, for it bears this legend "A sledge that reached the Pole." In reality, success has come to Polar exploration through use of the sledge as a means of travel.

Before 1820 ships alone were used. When frozen in, an expedition was delayed until a time of thaw. It was not until the second or third voyage of Parry and the second of Sir John Ross, that is in 1821 and 1834, that sledging expeditions began and the fact was discovered that "ice which arrests the progress of the ship forms the highway for the sledge." Since that time, there has been great advance in sledge construction, in the light of which fact it is interesting to compare the sledges in the possession of the Museum. This sledge that reached the Pole is 12 feet long and 2 feet wide. It consists of two wooden runners curved upward at both ends and wooden slats crossing the runners several inches apart and bound loosely to them by thongs of walrus hide. Light and flexible, it is able to rise and dip through the snow of steep descents without the slightest injury to itself, and has surely proved its fitness for Arctic travel.

The exhibit is instructive as to the manner of maintaining life in the difficult environment of the Arctics. A case is filled with the skins and tools used in igloo building, another contains kayaks, harpoons and various fishing and hunting paraphernalia. From the facts brought out here, we learn the total dependence of the Eskimo on the few animals of the region, particularly the walrus and the seal. Still other cases contain garments of fur,—fur of fox, seal and reindeer. They show also coats made by fastening together many small bird skins.

There is much suggested also in the matter of Arctic travel aside from what has already been noted. One case contains the instruments used in exploration, such as sextant, chronometer and compass, and beside these which tell of the success of science in invention and of exploration in making use of this invention are dramatically placed various crude implements and vessels fashioned by the Eskimo from copper taken from the wreck of Sir John Franklin's ship. An arching label "A Century of Arctic Exploration" calls attention to still other cases containing the many books descriptive of expeditions to the Arctics.



THE PEARY CARIBOU (*RANGIFER PEARYI ALLEN*).

Peary Arctic Club Exhibit.

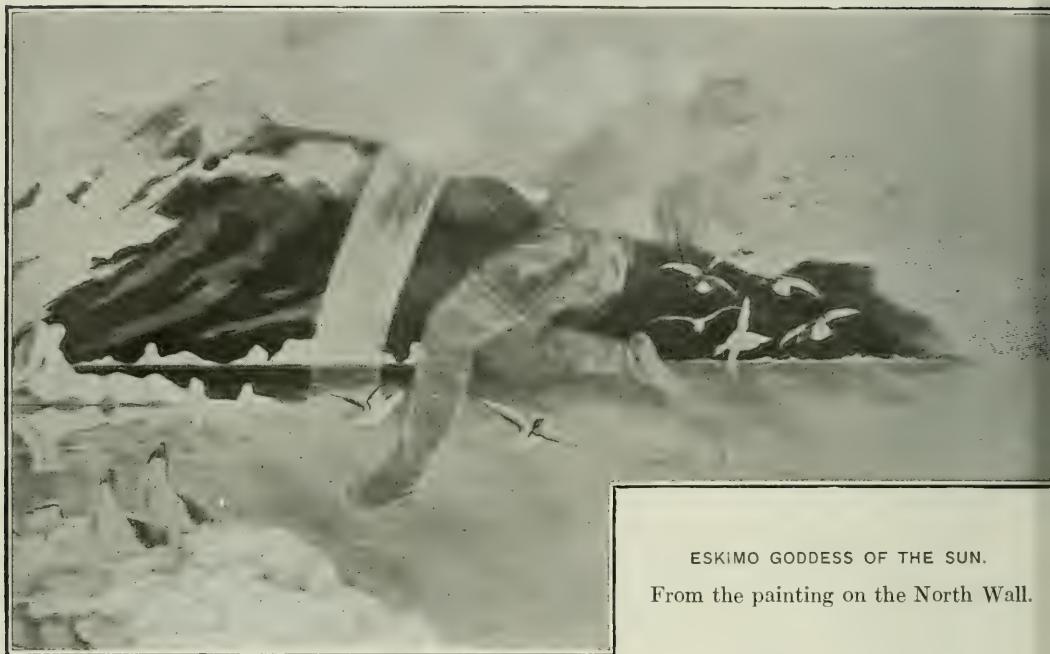
These books lie open at their title pages and, covering the time from the work of Sir John Ross to the present, invite further investigation.

As a whole, the exhibit has a note of triumph in it. There is triumph in the discoveries to science of lands and waters, in the improvement in life for the Eskimo through the intervention of civilized man, in the final direct route that Peary made and the American flag floating above "the top of the world" in the map on the floor. The visitor reads also a greater triumph than these, for one who has heard accounts from the lips of northern explorers or has felt a choking in the throat over the experiences recorded in some of the vivid writings of these same men, realizes the hardship involved in Polar exploration, the years of privation and physical distress, of sacrifice of all that to ordinary mortals makes life worth living. He knows that there has been set before the world an example of what above most things makes life worth living,—the indomitable courage and perseverance that ends in accomplishment.

THE MURAL DECORATIONS OF THE ESKIMO HALL.

THE mural decorations at the northern end of the Eskimo Hall have been painted by Mr. Frank Wilbert Stokes, an artist, who, as member of the Peary Relief Expedition of 1892 and of the Peary North Greenland Expedition of 1893 and 1894, has made careful study of the Eskimo people and their frozen country.

Ranged about the hall below are the weapons, the articles of dress, the boats, the sleds, while above them in this painted frieze these same objects are seen put to use in the daily activities of the Eskimo, revealing his adaptation to an environment of months' long days and nights among glaciers and icebergs. The combination of the scientific exhibits below and the artist's work above, brings home to the observer not only the ethnological facts involved, but also other facts, such as the austerity of Eskimo life, its enforced simplicity and the limitations set upon civilization for the people of the Arctics. Much of the interest of these pictures rests in the fact that many of the scenes represent localities actually visited by the artist. Mr. Stokes established his studio at Bowdoin Bay, $77^{\circ} 44'$ N. latitude, and worked there during fourteen months, with the primitive life of the Eskimo and the glowing colors of the northern land under constant observation. As William Walton has said in an article in Scribner's Magazine for February, 1909, Mr. Stokes has here succeeded, despite the



Copyright 1908 by Frank Wilbert Stokes.
Courtesy of Scribner's Magazine.

ESKIMO GODDESS OF THE SUN.

From the painting on the North Wall.

inadequacy of pigments, in well suggesting "the utmost splendor of light that blazes in the Polar skies and glows in the Polar, translucent ice."

THE NORTH WALL.

The largest picture of the series — in full view from the main foyer of the Museum — is a continuous panorama sixty feet long. It is intense and realistic in its coloring. In the center the glow of a midnight sun illuminates promontories and sea, toward the right this brilliant color gradually fades to the gray and purple of the twilight that precedes the long Arctic night, while toward the left it changes to the white lights and deep blue shadows of that other twilight that foretells the approach of the long Arctic day.

Against the vivid gold and red of the center of the painting is portrayed the artist's conception of the Eskimo myth of the "Sun and the Moon." There is presented a giant mirage of two figures in full pursuit through the air. These figures are Ahn-ing-ah-neh, a hunter, typifying



ESKIMO CONCEPTION OF THE MOON, A HUNTER IN PURSUIT OF THE SUN.

*Copyright 1908 by Frank Wilbert Stokes.
Courtesy of Scribner's Magazine.*

the moon and ushering in the long winter, and Sukh-eh-nukh, standing for the sun, a goddess accompanied by summer and plenty. Ahn-ing-ah-neh is dressed in winter garb and is driving his team of dogs. The lower part of the figure, like the dogs and sledge, are shadowy in the painting, but the upper part reaching forward in the chase, the head and the right arm with its lashing whip, stand out strong and dark as the forward part of a night cloud that sweeps over the glacier-covered heights. Sukh-eh-nukh is represented by a figure uncovered to the waist (the Eskimo, both men and women, occasionally strip off the upper garments in the summer sun). She carries in her right hand an Eskimo lamp, shown as a sun-dog or parhelion such as is often seen near the horizon at sunrise and sunset in the Arctics. She is a part of a cumulus summer cloud that floats near her head. Summer birds are about her, a long line following from the far away horizon. Two fulmar gulls are flying in front of her, and two harbor seals are crying to her, the "Mother of the Seals," from floating ice below, where also little Arctic puffins are ranged in military line.

The story of the pursuit of the sun by the moon is a legend widely spread among the Eskimo people. The North Greenland Eskimo believe, as do all other Innuits from Alaska to Labrador and Baffin Land, that the sun was originally a woman, Sukh-eh-nukh, who in order to escape the unfilial love of her brother, Ahn-ing-ah-neh, fled into the heavens bearing a lighted torch. The brother also carrying a torch pursued her and was transformed into the moon. It is believed that the moon is forever in love with the sun and seeks ever to overtake her, but that since his torch chanced to be a poor one and he is frequently compelled to return to earth to relight it, the sun is enabled to keep well in



Copyright 1908 by Frank Wilbert Stokes.

POLAR BEAR AT BAY.

From the painting on the North Wall.

advance. According to the myth, disaster would come if he should succeed in catching her, for with his embrace would come the end of all things.

This legend of the sun and the moon has many variations among the Eskimo people and is sometimes termed the Sedna Cycle, Sedna also signifying the sun. It is possible that we have here not only an allegory of the great Arctic day and night, but also the proof that there has taken root in Eskimo imagination the idea of man's search after the unattainable.

The right portion of the painting, realistic in the extreme, represents the twilight before the approach of the long night, the dramatic interest resting in an encounter between an Eskimo hunter and a polar bear. The hunter has left his sledge and, accompanied by his team, has followed in the chase. He has used his arrows and is now near enough to give a thrust with his lance, the bear's attention being held by the dogs.

That part of the painting at the extreme left tells the Eskimo's method of stalking prey. In the foreground on an ice-floe a hunter, harpoon in hand, is crawling slowly toward two ring seals, which lie basking in the



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ESKIMO STALKING THE SEAL.

From the Painting on the North Wall.

sun near their hole. Eskimo hunters have great skill in giving decoy sounds. They can make cautious approach to gulls by waving a gull's wing in the air, while whistling the bird's notes; they can allay the suspicions of seals by lying flat on the ice and waving a foot in imitation of a seal's head, while giving the characteristic calls of the seals. Beyond the seal hunter in the distance rises above the ice of the glacier, a bell-shaped elevation of land which the Eskimo knows as a "numatak." Still farther to the left towers an iceberg, while over all is the dawning light of the summer that is being ushered in by Sukh-eh-nukh, the sun goddess.

THE EAST WALL.

The first or northern panel — An Innuit Encampment in Late Autumn.

Pictures of actual events in Eskimo life are continued on the east and west sides of the hall, the unity of the compositions being gained by making the sky line in the east and west panels the same as that of the painting on the north wall. The three panels on the east wall continue pictures of Eskimo life as it goes on during the Arctic night.

The first of the panels gives a view of Inglefield Gulf, which by November is well frozen over. In the foreground to the right an Innuit (Memkashoo) is cutting up pieces of meat and feeding his team after a hunting trip. The sledge lies to the left, and just beyond is an Innuit woman with her babe carried on her back in a pouch. Such a pouch is made of fox skin and is a part of the hooded upper garment. The head and shoulders of the child are covered by soft fox skin, but the rest of its body lies naked against the mother's bare back and so is kept warm. The child is secured in the pouch by a sinew which passes around its body and around the upper part of the mother's waist.

A little Innuit boy stands by his mother, watching his playmate, an Eskimo puppy. Immediately to the right is the stone-built entrance of the igloo, or winter residence, which, partly covered with snow, is itself seen directly behind the figures. The seal-entrail window of the igloo reveals a pale light from the lamp within, a lamp which must serve the purposes of lighting, heating, cooking and drying for the whole family.

Beyond in the middle distance to the left is a bay, its shore covered with snow which is about three inches in depth at this season. Beyond the bay is a long low promontory stretching into the sea, a November sea, completely frozen over and with an iceberg frozen into it. The stars are brilliant in the sky, while mountain, sea and shore are enshrouded in rich orange light from a sun that is gradually receding.

The Central Panel — Walrus Hunting in February.

The east central panel represents a February scene on the ice of Baffin Bay, which is never completely frozen over. The flaming colors of the Aurora Borealis fill the sky and are reflected by the ice. In their



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ESKIMO ENCAMPMENT IN LATE
AUTUMN.

The north panel of the East Wall.





Copyright 1908 by Frank Wilbert Stokes.

WALRUS HUNTING IN THE LIGHT OF THE AURORA BOREALIS.

The central panel of the East Wall.

weird light is made visible the attack of an Innuit hunter upon a large walrus, one of a group of three in the central foreground of the picture. In the immediate foreground to the right a bull walrus is just emerging from the water. There is no look of fear in the animal's dog-like eye, since he has not yet caught sight of the hunter.

In the Arctics the barking of walrus can be heard for miles. When

the Innuit hunter hears it, he may hitch six or eight dogs to his sledge and travel toward the sound, often with only the light of the moon or of the stars to show him the way. When within a thousand yards to the windward of the animals, he tethers his dogs to the ice, and if they are unaccustomed to hunting and will not remain noiseless, he may turn the sledge upside down, to check any attempt on their part to run away. Armed with a stout harpoon and plenty of walrus-hide line, the Innuit crawls over the ice toward the animals. He conceals himself behind ice blocks or hummocks until the distance between him and the animals is short, then suddenly leaps to his feet, singles out a big bull (as in the painting) and strikes — usually with unerring aim. The whole herd, barking furiously, rushes for the sea. The stricken bull dives, and the walrus-hide line pays out rapidly, but not before the Innuit has deftly thrust his lance, which he carries in his free hand, firmly into the ice. With knee and shoulder braced against the shaft of the lance, he obtains sufficient purchase to play the walrus until the big fellow is so weakened by loss of blood that the hunter can leave his lance to cut two holes in the ice close to the spot where he is standing. Now, whenever the line is slack, he hauls in a few fathoms, and running the noose a couple of times down through one hole and across through the other, obtains a more reliable hold. With the lance now free, he stands over the breathing hole, striking the walrus each time that it rises. When it is finally despatched, he cuts off piece after piece of the meat and seeks his sledge and dogs to carry the spoil home.

Walrus are huge ungainly creatures, weighing upwards of three thousand pounds, but to the nimble Innuit hunter there is usually no difficulty in getting out of harm's way on the ice after he has struck the blow. If, however, the iron point slips, or the ice gives way, or if, as the coils of the line are running out, the hunter's legs become entangled, he is quickly dragged down beneath the water to speedy death.

The Third or Southern Panel. Peterawik in Moonlight.

The third panel represents a winter scene at Peterawik on the shore of Smith Sound. In the foreground at the extreme left is a hunter with sledge and dogs, bringing a load of walrus meat. His snow igloo is at the right, where his wife, carrying a child in her hood, and accompanied by an Eskimo woman, is waiting to welcome him. The sea-ice of Smith

Sound stretches far to the horizon at the north; the head-line of Cape Alexander is visible in the distance. The rocks at the right are characteristic of the west coast of Greenland at this latitude, 76° N.

In the spring before the ice breaks up, the Innuits congregate at Peterawik for walrus hunting. They build their snow igloos on the ice foot, that portion of the sea-ice bordering the land. Here they remain hunting, frolicking and feasting in their joyous fashion, until the sun's warmth has broken up the ice. Then they travel southward, still over the ice, some to the settlements of Inglefield Gulf and others even as far as Cape York.

THE WEST WALL.

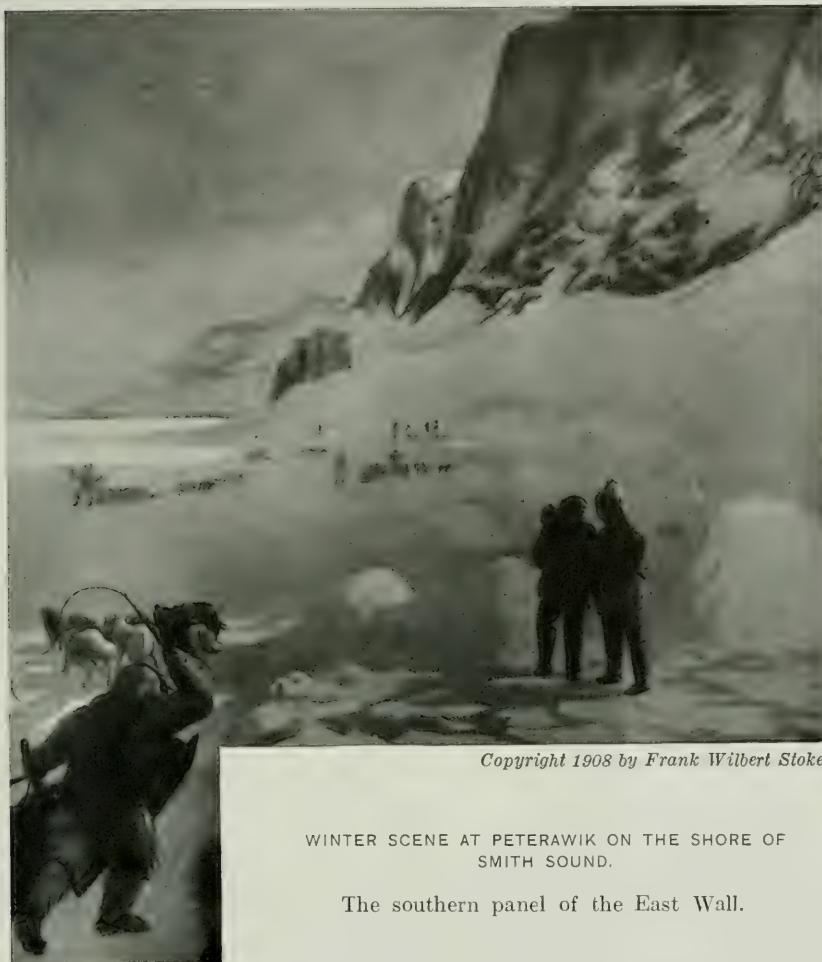
The First or Northern Panel—Reindeer Hunting in Summer.

The paintings on the west wall represent Eskimo life during the long Arctic day.

In the middle foreground of the northern panel a hunter, crouching at the top of a rocky prominence, is in the act of drawing his bow of bone and sinew upon a white reindeer,¹ which has espied too late something to excite its curiosity. In the middle distance at the extreme right, is the continuation of the large iceberg of the central panel of the north wall. Icebergs in the Arctic regions are frequently from 150 to 300 feet in height, measure five to seven times this distance below the surface of the sea, and sometimes have a length of three miles. Beyond the iceberg in the distance is a glacier flowing down from the great ice "Sahara" in the interior of Greenland, while to the left is a dark rocky portion of the submerged land.

In the immediate foreground are purple flowers (*Epilobium latifolium*) which nestle in pockets in the rocks. The middle foreground is covered by stunted grass and mosses, especially by reindeer moss on which the deer are feeding. Many flowers bloom in Greenland and other polar lands during the short summer, notably members of the mustard family, and of the pink, rose, saxifrage and grass families. There is one species of sedge known; willows and birches are found, although growing only two to three inches in height; while daisies, buttercups, yellow poppies, harebells, dandelions, gentians and primroses cover the ground in many places.

¹ A white caribou (*Rangifer pearyi* Allen) discovered by Peary in 1902 in Ellesmere Land near Lake Hazen, latitude 82° N.



Copyright 1908 by Frank Wilbert Stokes.

WINTER SCENE AT PETERAWIK ON THE SHORE OF SMITH SOUND.

The southern panel of the East Wall.

Another source of bright color in these northern latitudes lies in two species of algae, one red and the other green. They are microscopic plants that grow on the ice or snow, but they may occur in such profusion as to impart their color to the ground. It is the presence of these algae that explains the famous "crimson glacier" or "crimson snow" near Cape York.

As to edible plants, there are a few even in this extreme northern region. A blueberry which grows partly concealed under the moss can be secured during the greater part of the year, and is eaten with



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REINDEER HUNTING IN SUMMER.

The northern panel of the West Wall.



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ESKIMO IN SEALSKIN CANOE HARPOONING A NARWHAL.

The central panel of the West Wall.

relish by the Innuit. There are several plants, of which roots, leaves, buds and even flowers are eaten. A plant resembling celery (*Angelica officinalis*) is a favorite article of food. Iceland moss is also eaten. The chief sources of vegetable food, however, are marine. A seaweed used commonly for food is *Alaria pyrillai*, closely allied to "bladderlocks," of Scotland, and in flavor somewhat like asparagus.

The Central Panel — Narwhal Hunting in Summer.

The dramatic center of this panel is an Innuit in his kayak or sealskin canoe in the act of harpooning a narwhal, which is visible beneath the surface of the water at the left of the boat. To the right in the middle distance are fulmar gulls. In the distance is the great ice river, the Verhoeff glacier.

The narwhal is an animal about which little is definitely known. Some, notably Peary, think that it is the fabled unicorn of the ancients. It occasionally has both a long and a short horn, one of which it may lose, however. The narwhal is blue-black along the back and spotted with dark along the sides, the color fading into ivory white underneath. The thin skin covers a very deep layer of fat or blubber, considered a delicacy by the Innuit. This blubber is eaten raw, as in fact is most of the food in the Arctics, and of course without pepper or salt, neither of which is known to the Eskimo.

In narwhal hunting, the Innuit approaches the animal from the rear and one side, decreasing the distance noiselessly until he is within striking distance. A companion always accompanies the hunter, so that, in the event of his being struck by the narwhal, and his boat overturned, there may be some rescue at hand. The harpoons used in narwhal hunting formerly had heads made of flakes from the iron meteorites near Cape York, but since the first quarter of the nineteenth century the Eskimo have obtained their metal from traders and from whaling and other ships. The harpoon head is joined to a piece of walrus or narwhal ivory, which fits loosely on to the ivory end of the shaft. To the center of this harpoon head, is fastened a line of walrus hide kept in place by the hand that holds the harpoon. The line itself is coiled on the fore part of the kayak, so that it will unwind rapidly and without becoming tangled. Attached to the other end of this line and placed in the after part of the kayak are two objects, a sealskin bag and a drag resembling a box lid. When the animal dives and flees vainly from the pain of the harpoon point imbedded in its flesh, the drag tires it out, and the skin bag, floating on the surface of the water, marks its position and keeps it from sinking. The hunter, who adroitly gets out of the way of the infuriated animal, can thus trace its course and finally tow it home.

The Verhoeff glacier represented in the painting is one of two glaciers

at the head of Robertson Bay, on the northern shore of Inglefield Gulf, West Greenland. It was here that Verhoeff, the meteorologist of one of the Peary Expeditions, while trying to cross the glacier alone, lost his life in September of 1892. The sea wall of the glacier is from 150 to 200 feet high, but the ice shelves out beneath the water, where the buoyancy of the sea breaks off parts which float away as icebergs. This birth of icebergs at the water's edge of a glacier often causes waves thirty or forty feet in height, miles in extent, and attended by volleys of thunderous reports that are terrifying in the ears of the Eskimo. Each of these glaciers is an arm of the inland ice cap of Greenland, a mighty sheet submerging mountains and valleys to a depth of 5,000 feet or more.

The Third or Southern Panel—Cape York, a Summer Home of the Innuit.

The scene depicted is at Cape York, a summer home of the Innuit, at the head of Melville Bay. Here the Innuit, or Arctic Highlander, as he was misnamed by Sir James Ross, is first met by those visiting the Arctics. The painting gives a view of Cape York looking toward the north.

In the foreground is the camp, where an Innuit leans over a harp-seal which he has killed and is about to cut up, while his dogs are watching for some stray pieces of meat. This man is clothed in bear-skin trousers and a hooded jacket made of about seventy auk skins, the feathers being turned next to the body. He is wearing boots of seal-skin.

To the left in the camp is a girl of about seven years, painted from a sketch made by the artist in 1894. She is clothed in small trousers of fox skin and an upper hooded garment, also of fox skin, and wears boots of sealskin, reaching to the thighs. She is attending a fire of moss and blubber, over which blood soup is being prepared, while guarding from the dogs a piece of meat on the ground at her right. Behind the girl are two sealskin tents (tupekhs) from one of which a young woman is emerging.

Beyond the tents are mountains towering 1500 to 3000 feet above the camp. The summits of these mountains are frequently obscured by dense fogs, from which come continually the wild cries of innumerable multitudes of kittiwake gulls and little auks.



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SCENE AT CAPE YORK, A SUMMER HOME OF THE ESKIMO.

The southern panel of the West Wall.



In this bay, but some miles to the eastward, the three meteorites now on exhibition in the foyer of this museum remained for ages. It was Peary who wrested them from their ancient abode and brought them to New York in 1895. From these meteorites, in olden times, the Innuit flaked off pieces for use in knives, harpoons and arrow heads, to aid in the struggle for food and life.

MUSEUM NEWS NOTES.

SINCE our last issue the following persons have been elected to membership in the Museum: Annual Members, MESSRS. WILLIAM H. ALLEN, CHARLES COLLINS, MAUNSELL S. CROSBY, GUSTAVE F. KOLB, GILBERT ROBERT LIVINGSTON, JR., HENRY MEHL, WILLIAM LINCOLN PARKER, HENRY M. TOCH, WM. WHITMAN, JR., and JOHN WILLIAMS and Miss ANNIE TWEEDIE.

THE LIBRARY has recently received from His Royal Highness the Illustrious Prince and Archduke Ludwig Salvator of Austria twenty volumes descriptive of the natural history of some of the islands and towns of the Mediterranean. These books were privately printed by the Archduke of Austria and were published in a most sumptuous manner. The works are as follows: Liparische Inseln, eight volumes, Ustica, Columbretes, Alboran, Benzert, Eggligio, Bougie, Zante (two volumes), Parga (two volumes), Leokas and a splendid panoramic view of Alexandrette.

MR. WILLIAM G. DE WITT, one of our Life Members, has just presented to the Library his private collection of more than two hundred volumes on microscopical subjects, which includes a complete set of the Transactions of the Royal Microscopical Society from the beginning to the present time.

THE Department of Anthropology has recently purchased from Professor Eugene Schroeder a collection from the South Sea Islands containing, among other objects, garments, hair ornaments, chains, fans, war clubs and an assortment of twenty-five shells from the Carolines.

THE Department of Ornithology has received thirty-one King and other penguins from the Antarctic, collected by Captain B. D. Cleveland. The series includes specimens of both young and adults and represents an entirely different kind of bird life from anything the Museum has had before.

On account of the recent introduction of the Brown-tail Moth to New York state, a special exhibit of the Brown-tail and Gypsy moths has been placed on the first floor near the elevators. The life histories of these pests together with the damage they do, relatively harmless insects which might be mistaken for them, and other introduced insects are shown.

THE fall exhibition of the Horticultural Society of New York will be held at the Museum from November 3 to 7. The exhibition will be open on Wednesday after 7 o'clock p. m. especially for the members of the Museum, the Society and affiliated organizations. On Thursday, Friday and Saturday from 9 a. m. to 5 p. m. and from 7 to 10 p. m., and on Sunday from 1 to 5 p. m., the exhibition will be open to the general public.

LECTURE ANNOUNCEMENTS.

MEMBERS' COURSE.

THE first course of illustrated lectures for the season 1909-1910 to Members of the Museum and persons holding complimentary tickets given them by Members will be given in November and December.

Thursday evenings at 8:15 o'clock. Doors open at 7:45.

November 18.—PROF. HERSCHEL C. PARKER, "Alaska and the Exploration of Mt. McKinley."

Professor Parker of Columbia University for many years has made a specialty of climbing the high mountains of northwestern North America and has made many first ascents in the Canadian Rockies and the Selkirks. He was one of the party that attempted the ascent of Mt. McKinley in 1906. His photographs are superb.

December 2.—MR. A. RADCLYFFE DUGMORE, "Camera Adventure in the Wilds of Africa."

Mr. Dugmore is a naturalist who has made a specialty of hunting big game with the camera, and his photographs obtained by flashlight and daylight are wonders. They preserve the record of a 1500-mile journey on foot through the dense jungle of British East Africa and include a charging rhinoceros at close range, lions at from nine to twelve yards distant and herds of hippopotamus, zebra and antelope.

December 9.—MR. DONALD B. MCMILLAN, "With Peary in the Arctic."

Mr. McMillan was a member of the scientific staff of the Steamer "Roosevelt" on her latest trip to the Arctic regions and was the leader of the second support-

ing party in Commander Peary's successful dash to the Pole. He had charge of the tidal work and of compiling notes on the Eskimo and the natural history of the expedition.

December 16.—DR. HUGH M. SMITH, "The Coast of Brittany and the Industries of the People."

Dr. Smith is Deputy Commissioner of the United States Bureau of Fisheries and has traveled extensively in the discharge of his official duties. Recently he made a particularly interesting excursion along the coast of France and obtained some remarkable photographs. The results of this expedition are embodied in this lecture.

PUPILS' COURSE.

THESE lectures are open to the pupils of the public schools when accompanied by their teachers and to the children of Members of the Museum on the presentation of Membership tickets.

Lectures begin at 4 p. m.

Oct. Nov.

Monday, 25 15.—"The Development of New York City." By ROY W. MINER.

Wednesday, 27 17.—"Life in the Arctic Regions." By MRS. A. L. ROESLER.

Friday, 29 19.—"American Forests and Their Uses." By GEORGE H. SHERWOOD.

Nov.

Monday, 1 22.—"Scenes in the British Isles." By LOUIS HUS- SAKOF.

Dec.

Wednesday, 3 1.—"Life Among Our Indians." By HARLAN I. SMITH.

Friday, 5 3.—"Animals Helpful to Man." By ROY W. MINER.

Monday, 8 6.—"Mining Industries of the United States." By E. O. HOVEY.

Wednesday, 10 8.—"Animals Injurious to Man." By F. E. LUTZ.

Friday, 12 10.—"Travels in South America." By LOUIS HUS- SAKOF.

PEOPLE'S COURSE.

GIVEN in coöperation with the City Department of Education.

Tuesday evenings at 8 o'clock. Doors open at 7:30.

All lectures illustrated with stereopticon views.

November 2.—MR. R. CORNELIUS RABY, "The Historic Alamo City."

November 9.—MISS MARY V. WORSTELL, "The Yosemite Valley."

November 16.—“MR. BENJAMIN S. COMSTOCK, “The Canadian Rockies.”
November 23.—DR. EDWARD P. CROWELL, “Across the New England States.”

November 30.—Lecturer and subject to be announced.

Saturday evenings at 8:15 o'clock. Doors open at 7:30.

DR. WILLIAM L. ESTABROOK,—the last four of a course of eleven lectures on inorganic chemistry, illustrated by experiments.

November 6.—“Chlorine and Hydrochloric Acid.”

November 13.—“Fluorine, Bromine and Iodine.”

November 20.—“Nitrogen and Its Oxides; Nitric Acid and Ammonia.”

November 27.—“Carbon and Some of Its Compounds.”

Children are not admitted to the lectures of the People's Course, except on presentation of a Museum Member's Card.

MEETINGS OF SOCIETIES.

Public meetings of the New York Academy of Sciences and Affiliated Societies are held at the Museum according to the following schedule:

On Monday evenings, The New York Academy of Sciences:

First Mondays, Section of Geology and Mineralogy;

Second Mondays, Section of Biology;

Third Mondays, Section of Astronomy, Physics and Chemistry;

Fourth Mondays, Section of Anthropology and Psychology.

On Tuesday evenings, as announced:

The Linnaean Society of New York;

The New York Entomological Society;

The Torrey Botanical Club.

On Wednesdays, as announced:

The Horticultural Society of New York;

The New York Mineralogical Club.

On Friday evenings, as announced:

The New York Microscopical Society.

The programmes of the meetings of the respective organizations are published in the weekly *Bulletin* of the New York Academy of Sciences and sent to the members of the several societies. Members of the Museum on making request of the Director will be provided with the *Bulletin* as issued.

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MARY CYNTHIA DICKERSON, *Associate Editor.*

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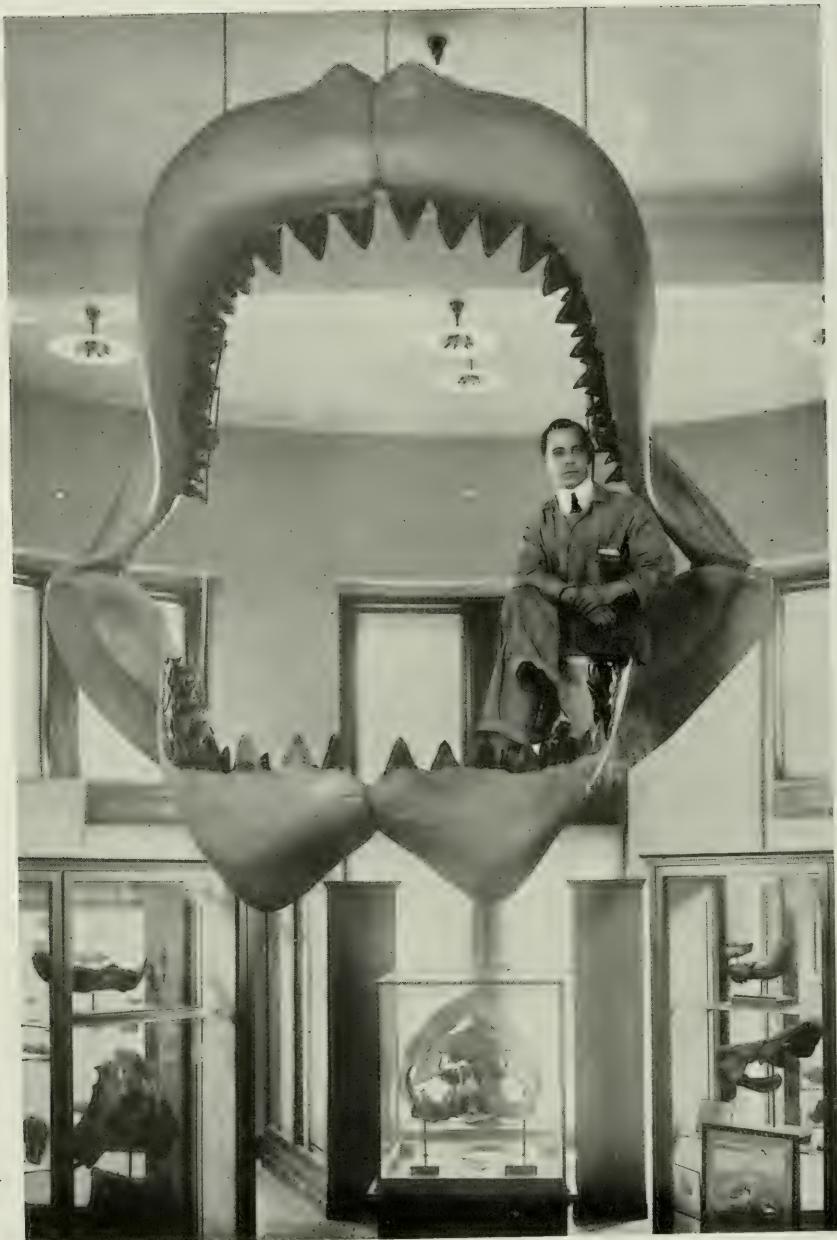
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Annual Members.....	\$ 10	Fellows.....	\$ 500
Sustaining Members (Annual).....	25	Patrons.....	1000
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All money received from membership fees is used for increasing the collections and for developing the educational work of the Museum.

The Museum is open free to the public on every day in the year.

* Deceased



RESTORATION OF THE JAWS OF THE FOSSIL SHARK, CARCHARODON MEGALODON.

The American Museum Journal

Vol. IX

DECEMBER, 1909

No. 8

THE GIANT OF ANCIENT SHARKS.

AT the entrance of the Hall of Fossil Fishes there is now exhibited a restoration of the jaws of a shark (*Carcharodon megalodon*) which lived along the coast of South Carolina, in Tertiary time. There can be no doubt that this was the largest and most formidable fish living or extinct of which we have any record. The jaws of a fully grown specimen measured about nine feet across and must have had a gape of five or six feet. The teeth themselves average about six inches in height in the middle of the jaw, and they gradually decrease in size in the direction of the sides of the mouth, the smallest teeth measuring about two inches.

In the present restoration the teeth have been arranged as in the living species of *Carcharodon*, the great White Shark or Man-Eater, for there can be no question that the fossil shark differed in no essential structure from its modern relative. Accordingly the jaws of *Carcharodon rondeleti* were carefully measured (a splendid pair having been loaned by the Museum of Natural History of Paris, through the courtesy of Professor Valliant), and the model was prepared according to scale, that is, in accordance with the proportions of the teeth in the extinct and in the living form. The fossil teeth were then arranged on the jaws in the same number of rows and in the same number of banks of graded sizes. Fortunately for this purpose a large assortment of teeth of the fossil shark was available, out of which an almost complete dentition was selected. This material had been collected during many years by a resident of Charleston, Joseph Cohen, and the collection was secured through a grant from the Cleveland H. Dodge fund.

The accompanying picture gives an idea of the impressive size of the ancient *Carcharodon*. Indeed from the teeth alone one can form a reasonably accurate estimate of the dimensions of the fossil fish, for it is known that a specimen of the living species in which the largest tooth was one and one half inches in height measured twenty feet, and that another having teeth three inches in height had a total length of forty feet. It therefore follows that the length of the Carolina shark whose

teeth measured six inches was approximately eighty feet, an estimate, by the way, which was made many years ago by Professor Goode. The largest living shark is the Whale Shark, *Rhinodon* which probably does not exceed fifty feet in length.

In spite of its great size, *Carcharodon* appears to have been quite common in its day, judging at least from the number of teeth found in the deposits of phosphate. And from this fact one may form an idea of the richness of the marine fish fauna of that time. For where there existed one of these sharks there must have been a vast number of fishes of the usual bony-fish type, for sharks are proverbially rapacious, and we can estimate fairly that the daily provisioning of so huge a creature implies the capturing of tons of bony-fishes. This is worthy of mention also, because it gives us a striking illustration of the imperfection of the geological record. It is a well-known fact that in regions where the teeth of this shark are plentiful, there occur few fossils of the common kinds of fishes. Even the most fragmentary remains of bony-fishes (teleosts) are usually lacking. It is none the less clear from the very presence of the sharks that a contemporary fish-fauna must have been represented in the most abundant way.

BASHFORD DEAN.

EXPERIMENTAL WORK WITH POMACE FLIES.

EXPERIMENTAL studies in evolution are important not only for their theoretical interest, but also because it is believed that the principles worked out in the lowest forms of life will apply also to domestic animals and plants and even to man.

It is the natural course of scientific progress for verbal description and speculation to be followed by mathematical statement and experimental analysis. Certain experiments were made even before Darwin's time and a large part of Darwin's own work was experimental; but the painstaking studies of de Vries concerning the origin of plant species, together with the recognition of Mendel's Laws of Heredity, not only have given an impetus to experimental evolution, but also, in a large measure, have determined the character of the work. As a consequence, research by pedigree breeding for de Vriesian "mutations" and the

testing of the manner of inheritance have been energetically carried on during the past few years and have yielded many interesting results. Other factors of evolution, such as the effect of environment, the laws of fluctuating variation, and selection, have also been studied quantitatively and experimentally, although to a less extent.

In these experiments it is important to know the characters of both the ancestors of the individuals used and of their progeny. Pedigreed cultures must be made. Therefore, it is desirable to use some rapidly breeding form which can be easily reared. Domestic animals and insects have been favorite zoölogical material, and among the latter the common red-eyed Pomace Fly (*Drosophila ampelophila*), also known as the Vinegar Fly, Sour Fly and Fruit Fly, has been found to be an excellent laboratory creature. It feeds upon fermenting vegetable matter. At ordinary room temperature a generation can be obtained every two weeks. The eggs are laid directly upon the food (*e. g.* ripe banana)



Fig. 1.

FIG. 1. FORE LEG OF A MALE POMACE FLY. *DROSOPHILA AMPELOPHILA*

and hatch in two or three days into legless larvae, or maggots, which pupate after about a week of feeding. The pupal period is four or five days long, and in a trifle over twenty-four hours after emergence from the pupal case the adults mate and a new generation is started. The adults live, on the average, three weeks or a month and the female may lay as many as three hundred eggs.

The males differ from the females very strikingly in the adult stage. They are somewhat smaller and the under side of the abdomen is more completely pigmented. The most interesting difference, however, is the possession by the males of a relatively large comb-like structure, upon the anterior legs (see Fig. 1). This is a secondary sexual character that is as pronounced as the antlers of deer. It would be explained by many, since no other function is apparent, as a male adornment which is pleasing to the female. However, I have found that the males from which the "sex combs" have been removed are just as successful in

getting mates as those which possess it, although strong evidence of sexual selection with respect to other characters is being obtained.

It is generally believed that close inbreeding is always attended by decreased vitality and disuse by degeneration. This is not the case with *Drosophila ampelophila*. It has been repeatedly bred for a large number of generations, mating brother and sister, without disastrous results. I have, furthermore, made careful measurements of the wings of successive generations and found that although my pedigree stock has not been allowed to fly for more than fifty generations, there has been no degeneration of the wing either as to size or as to venation.



Fig. 2.

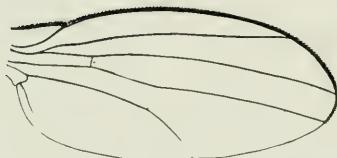


Fig. 3.

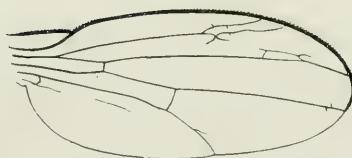


Fig. 4.

FIG. 2. A WING OF DROSOPHILA AMPELOPHILA SHOWING REDUCTION OF VENATION DUE TO SELECTION.

FIG. 3. A NORMAL WING OF DROSOPHILA AMPELOPHILA.

FIG. 4. A WING OF DROSOPHILA AMPELOPHILA SHOWING INCREASE OF VENATION DUE TO SELECTION

interpretation of the results of this work is complicated by the fact that the two sexes display the abnormalities to unequal degrees and also because the mode of inheritance deviates strongly from expectation on the basis of the commonly accepted laws.

F. E. LUTZ.

THE GUFFEY, COLORADO, METEORITE.

IN November, 1907, two cowboys, Robert L. Pope of Canyon City, Colorado, and J. T. Witcher of Guffey, Park Co., Colorado, discovered an iron meteorite while they were riding after their cattle along the head waters of the Freshwater River. The exact location of the find is the N. E. $\frac{1}{4}$ of the N. E. $\frac{1}{4}$ of Section 16, Township 35, Range 72, 6th Principal Meridian, W. in Fremont County, Colorado. The nearest post office is Guffey, Park County, about three and one half miles from the spot where the iron was found. The cowboys secured help and at last succeeded in getting the mass out of the mountains and to Cripple Creek. The American Museum purchased it from the finders, and it is now on exhibition in the foyer.

Guffey, as it must be called from the name of the post office nearest to the spot where it was found, is a "siderite," or wholly metallic meteorite 36 $\frac{1}{2}$ inches long, 15 inches in maximum height and 8 inches wide. Its weight is 682 pounds. The mass is roughly pear-shaped, but much flattened. One edge is so straight and is so nearly rectangular with reference to the adjoining sides that it seems like a definite fracture, indicating the possibility of there being another fragment or other fragments of the meteorite in the vicinity of the spot where this was found. The surface of the iron is covered with an extremely thin film of black iron oxide, which looks as if it might be the original skin formed by the passage of the meteorite through the air. At any rate, the iron is free from rusty scale and apparently had not lain long upon the mountain before it was found. The statement is made that a vivid meteor passed over the Freshwater River region in the fall of 1906, and the supposition is that this mass is a part of it. The evidence, however, is not strong in support of this theory. The cowboys who found the iron were not searching for a meteorite, and in fact did not know that they had found one. The brilliant white color disclosed on rubbing the surface led them to suppose that they had found a mass of pure silver, and they started to get it to town accordingly, after making an unsuccessful effort to cut off the small end of the specimen.

Two sides show in good development the "thumb marks" or "piëzoglyphs" characteristic of meteoritic masses. These markings are particularly deep upon the flat side shown in Figure 2, and they are less



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FIG. 1. GUFFEY METEORITE. FRONT, OR "BRUSTSEITEN".

Shows furrows and subconical pits due to flowage as a result of superficial melting produced by friction with the air. These furrows and points indicate that the meteorite passed through the air with this side and the upper right hand end in front most of the time.



FIG. 2. GUFFEY METEORITE. REAR SIDE, PROTECTED DURING ITS JOURNEY THROUGH THE AIR.
The depressions called thumb-marks or piezoglyphs, which usually cover the surface of a meteorite, are strongly developed on this side of the mass.



FIG. 3. GUFFEY METEORITE. UPPER EDGE OF MASS AS EXHIBITED.

The upper left hand portion of this edge probably was in front during most of the meteorite's flight through the air. The surface is indented with numerous thumb-marks and flow furrows.



FIG. 4. GUFFEY METEORITE, LOWER EDGE OF MASS AS EXHIBITED.

Showing the straight, almost rectangular relation of this surface to its neighbors, which indicates a probable fracture of the original mass, while in the air. Piézoglyphs, or thumb marks, are poorly developed on this surface.

pronounced and somewhat more elongated in the round edge shown in Figure 3. The flat side shown in Figure 1 has comparatively few round piëzoglyphs, but it has many pits, grooves and points due to the flowing of the melting surface of the mass during flight through the atmosphere. The almost square edge, which is illustrated in Figure 4 and which is considered to be an abrupt fracture occurring when the meteorite was near the end of its atmospheric flight, has an oxidized skin like the rest of the mass but shows piëzoglyphs very imperfectly.

Figure 1 shows the side which was in front during most of the meteorite's atmospheric flight and is called by the Germans the "brustseite." The position of the furrows indicates that the line of flight was toward the upper right hand quarter of the mass as shown in this picture. Although the iron is unusually uniform and dense in structure, as will be brought out under the discussion of its composition, it evidently yielded unequally to the heat produced by friction with the atmosphere, and the air in passing over its surface plowed deep furrows ending in subconical pits and left sharp projections pointing forward in the direction of flight.

A piece of the iron which had been sawed from the small end of the mass was polished and etched with dilute nitric acid at the Museum and



FIG. 5. GUFFEY METEORITE. PHOTOMICROGRAPH.

Polished section magnified 100 diameters to show crypto-crystalline structure.

gravity. The chemical analysis, made by Booth, Garrett and Blair, resulted as follows:

was afterwards polished again and treated with dilute and strong nitric acid and picric acid in succession by the chemists, Booth, Garrett and Blair, Philadelphia, picric acid proving to be the best mordant. The surface does not show the Widmanstätten lines usually characteristic of meteoritic iron, but instead it possesses an extremely fine granular crystalline structure, which is shown magnified 100 diameters in Figure 5 from a photomicrograph made by the analysts. The homogeneous character of the mass and the paucity of nonmetallic contents are indicated by the high specific

Iron	.	.	.	.	.	.	.	88.687%
Nickel	.	.	.	.	.	.	.	10.547%
Cobalt	.	.	.	.	.	.	.	0.546%
Chromium	.	.	.	.	.	.	.	0.018%
Manganese	.	.	.	.	.	.	.	none
Carbon	.	.	.	.	.	.	.	0.025%
Silicon	.	.	.	.	.	.	.	none
Sulphur	.	.	.	.	.	.	.	0.016%
Phosphorus	.	.	.	.	.	.	.	0.020%
Total	.	.	.	.	.	.	.	99.859%

Specific gravity, 7.939.

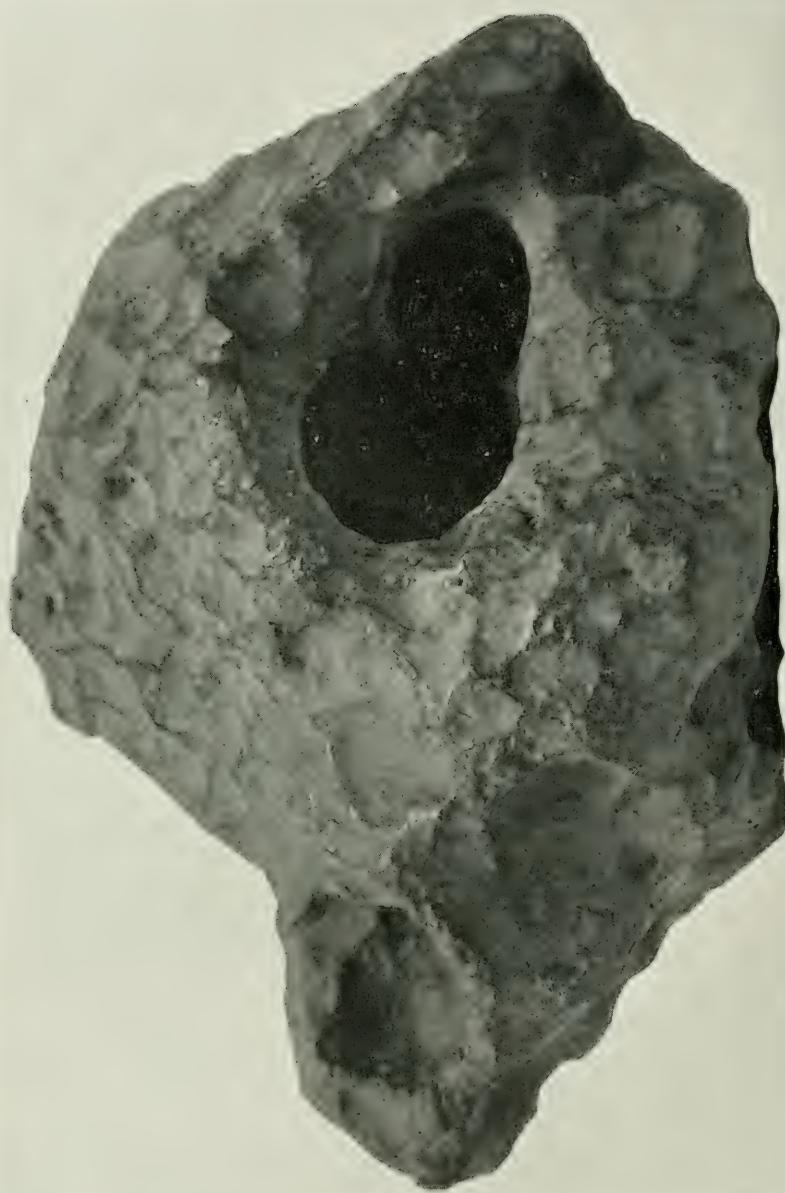
This analysis shows that the Guffey meteorite contains rather more than the average percentage of nickel and cobalt and unusually low percentages of carbon, sulphur and phosphorus. The extremely small amount of sulphur found indicates the practical absence from the mass of troilite, the protosulphide of iron which is found only in meteorites. This inference is substantiated by the few particles of this mineral which are to be seen on careful examination of the surface. The low content of phosphorus might have been inferred from the practical absence of schreibersite (a phosphide of nickel and iron characteristic of meteorites) as shown by the polished and etched specimen, this mineral being the substance that usually brings the Widmanstätten lines out in relief.

EDMUND OTIS HOVEY.

RECENT ADDITIONS TO THE METEORITES IN THE FOYER.

DURING the past summer three important accessions were installed among the meteorites in the Foyer. They were (1) the newly discovered iron known as Guffey which is described elsewhere in this issue of the JOURNAL, (2) a slice and cast of the iron meteorite called Gibeon and (3) the largest known portion, weighing 20 pounds 3 ounces, of the stone meteorite Modoc.

The manner of installing the Gibeon section is a new departure in the mounting of meteorites, as far as we know. About two years ago we received through exchange with the Natural History Museum of Hamburg, Germany, a plaster cast of the larger of the two known por-



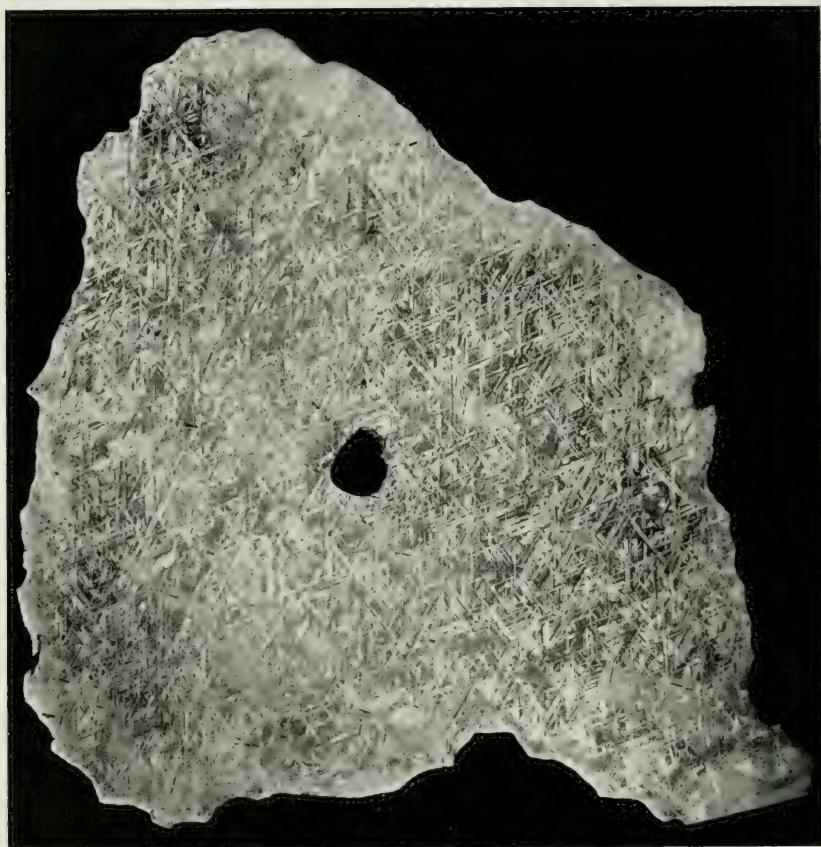
GIBEON IRON METEORITE. GENERAL VIEW.



GIBEON IRON METEORITE. GREAT NAMAQUA LAND, AFRICA.

Cast iron reproduction with etched slice of original in its proper position. The electric light has been inserted in order to display clearly the "Widmanstätten lines" that show the crystalline character of meteoritic iron and the lack of such lines in artificial iron.

tions of this interesting find, together with a polished and etched slice giving a complete section of the mass in its greatest dimensions and showing in remarkably beautiful development the Widmanstätten lines that are generally characteristic of meteoritic iron. The original mass weighed 562 pounds. We determined the correct position of the slice in



GIBEON IRON METEORITE. POLISHED AND ETCHED SECTION.

One fourth natural size.

the plaster cast, cut the latter in two and fitted the slice into its proper place. Then we had each portion of the plaster cast reproduced in cast iron, and hinged the two parts together, with the natural section in its original position, thus showing not only the appearance of the mass

as found but also its internal crystalline structure. We also polished the opposing surface of the cast iron reproduction and treated it with dilute nitric acid in the same manner as the meteorite itself had been treated, in order to bring out the fact that artificial iron does not possess the crystalline structure which is so characteristic of the other. A natural depression fortunately pierced the upper half of our cast and gave us an ideal way of introducing an electric light to enable visitors to see clearly the Widmanstätten lines of the meteorite and the amorphous character of the cast iron.

The meteorite takes its name from the little village of Gibeon whose geographical position is about $25^{\circ} 8'$ South latitude and $17^{\circ} 50'$ East longitude in the eastern part of Great Namaqua Land, in German southwest Africa, the home of the Hottentot. Two other famous iron meteorites have been found within a radius of 125 miles of Gibeon: Mukerop, of which there is a fine slice in the Ward-Coonley collection of meteorites, now in our Hall of Geology, and Lion River, which came from near the hamlet of Bethany and is represented by a small part of a slice in our general series. The latter has been known for more than half a century, having been described by Prof. C. U. Shepard in 1856. The former has come to public notice more recently. It resembles Gibeon in crystalline structure so closely that some authorities have been inclined to consider them parts of the same fall. Lion River, however, is entirely distinct in character.

Modoc is an aërolite or stony meteorite that was seen to fall near the town of Modoc, Scott County, Kansas, and the occurrence is described by Mr. J. K. Freed, an eyewitness of the fall and the finder of our specimen, as follows:

"The meteorite appeared as a ball of fire in the west September 2, 1905, at 10 o'clock in the evening, the sky being cloudless and the clear atmosphere of the plains being undisturbed by wind. From Scott City to Syracuse, 75 miles southwest, it was light enough to read common newspaper print on the street and the explosions rattled doors and windows. The mass exploded, and then the resulting fragments exploded several times in rapid succession. The fragments gleamed brightly at first but their light went out almost immediately after the explosions. Then came the sounds of the explosions, the whistling like bullets or heavy hail of the smaller fragments and a most intense humming like that of a rapidly revolving cylinder of some heavy machine, evidently caused by the larger mass. This was followed by

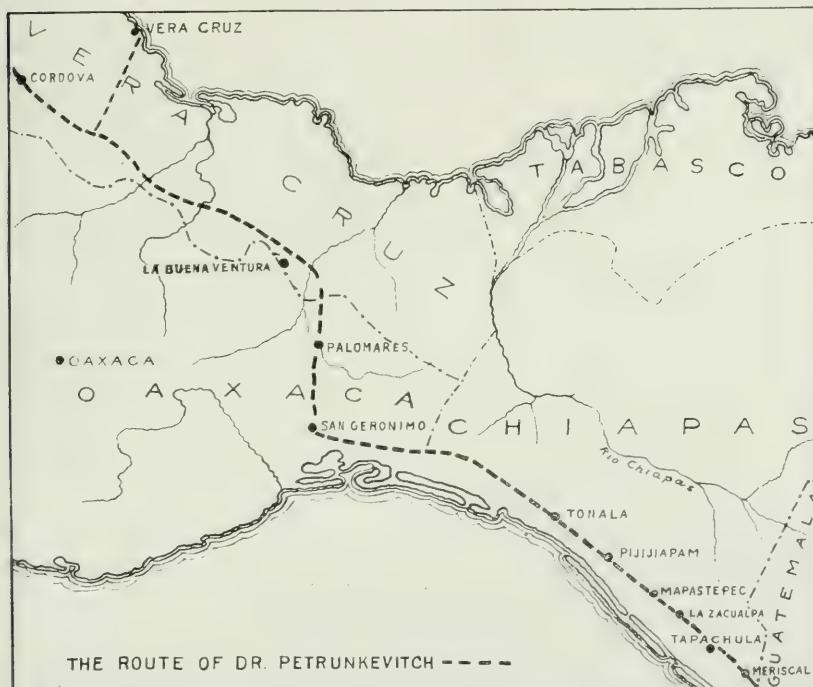
fierce cannonading (echoes of the explosions?) like the discharge of a battery of artillery or a rapid-fire machine gun, gradually growing fainter and dying out like rolling thunder in the distance. The first explosion took place about 40 miles west of the fall and fully as far above the surface of the earth. The fragments were scattered over an area nine miles by three; the largest ones going farthest. I heard the largest one drop and hunted for it for over two years.

“On May 6, 1908, I was breaking new ground on the prairie with a gang-plow and a five horse team that was a little too high-spirited to be controlled easily, but having half-mile furrows as smooth as a lawn before me, I had set the plow a few notches deeper into the ground and let them go, thinking nothing of meteorites. While congratulating myself upon our speed we suddenly — very suddenly — struck something hard. It threw me out of my seat and piled my gang-plow up in a promiscuous heap against the team, which was too badly surprised to do anything. I had plowed hundreds of acres and knew there was not a rock within ten miles of me, so my first thoughts were of dynamite. After sitting for some time trying to think, I ventured back to where my plow had left the ground. Seeing nothing, I commenced stabbing with my jack-knife and soon located the cause of the disturbance. It was the largest fragment of the Modoc meteorite and completely buried under the tough buffalo sod (virgin soil) and was pounded in so hard that the force of the blow of my gang-plow had not loosened it. So completely was it buried, that I had hunted dozens of times all over that pasture without either finding the rock or the hole in the ground which it had made.”

Twenty-five fragments of Modoc have been found. All are covered with the thin glassy black coating or “skin” that is generally characteristic of aërolites and that is caused by the melting of the surface in the great heat generated by friction with the air during flight through the earth’s atmosphere. Flakes broken off by the plow reveal the interior of the mass and show that the meteorite is composed of whitish stony material like some terrestrial lavas, but containing bright specks of metallic iron.

A TRIP TO SOUTHERN MEXICO FOR SPIDERS.

WHEN I found in June, 1909, that I was to visit southern Mexico to collect spiders, I anticipated the trip with great interest since only a few species of spiders had been described from the States of Vera Cruz and Tabasco, while Chiapas remained entirely unexplored. From the geography of the country we should expect to find a continuation of the Central American coast fauna along the



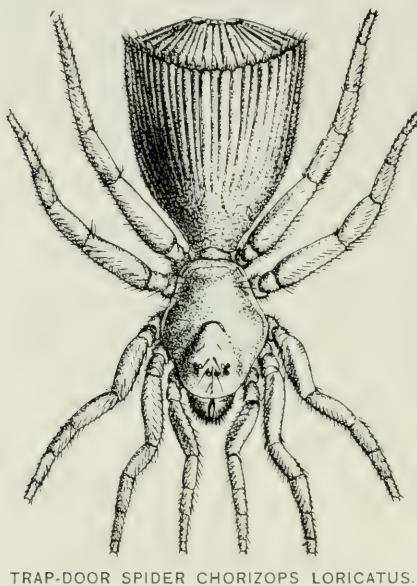
MAP OF SOUTHEASTERN MEXICO SHOWING REGION VISITED BY DR. PETRUNKEVITCH.

Pacific coast of Chiapas. On the other hand, the fauna of the lowlands of Tabasco, Campeche and Yucatan shows some relation to the West Indian fauna, which itself has close relation to the fauna of Venezuela. Thus a study of the fauna of Central America is a clue to the understanding of the insular fauna which represents remarkable features in the West Indies.

I left New York July 1 by the Ward Line of steamers and landed

at Vera Cruz, July 9. The sky was cloudless, and vegetation showed all signs of prolonged drought. During the day the breeze from the sea

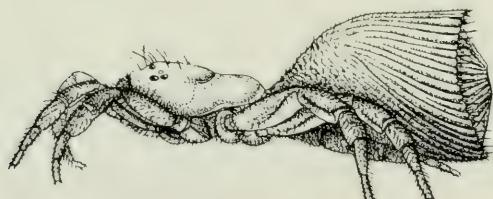
was refreshing, but each evening this died away leaving the night hot and uncomfortable. After two days at Vera Cruz, I went south on the Vera Cruz al Istmo Railroad, passing alternately through savannas of mesquite and palms and extensive, beautiful jungles. Leaving the train at the Santa Rosa flag station on the Isthmus of Tehuantepec, an hour's ride brought me to the rubber plantation La Buena Ventura, where it was my good fortune to experience for ten days the hospitality of Mr. J. C. Harvey, one of the owners. Mr. Harvey has extensive knowledge of tropical plant and animal life



TRAP-DOOR SPIDER CHORIZOPS LORICATUS.

But one other specimen is known.

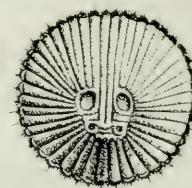
and is a specialist on palms and orchids. His house is surrounded by a veritable botanical garden of trees and other plants from all parts of the world, while the plantation itself is picturesquely shut in by the jungle.



TRAP-DOOR SPIDER, CHORIZOPS LORICATUS.

Side view.

Enlarged.



End of abdomen, used
as the "trap-door."

Judging from foot-prints, the locality was a good one for hunting jaguar, tapir, wild swine and deer, but I was intent on smaller game. In the depth of the jungle, there is little life on the ground. Along the

trails, however, and at the edge of the woods are great numbers of butterflies and grasshoppers and many species of other insects. During two days, one species of butterfly was migrating high over the jungle in immense numbers. I found two large tarantulas common. There was found also and presented to me by Mr. E. Howard, a specimen of a very rare trap-door spider, *Chorizops loricatus* C. K. There is only one other specimen of this spider known to exist, and that is in the Paris collection.

After leaving La Buena Ventura, I spent four days at Palomares in



E. O. Hovey, Photo, 1906.

SANTA LUCRECIA. A NATIVE VILLAGE ON THE Isthmus of TEHUANTEPEC.

the State of Oaxaca on the Isthmus. Here there is also an extensive jungle, but the character of the vegetation is somewhat different, owing to different soil. It did not, however, afford enough peculiarities to merit a long stay, so I proceeded to San Geronimo. At this place, the country has the character of a semi-desert with mesquite and cactus and very little rainfall. This year, however, about a week before my arrival, an especially heavy rain flooded the land for miles. The water ran off quickly, and soon the heat of the sun caused the soil to crack,

forming crevices in all directions, some of them more than three feet deep and so broad that I could thrust my arm into them. Much of the life of the surface evidently had been destroyed by the water. I found many hundreds of trap-door spiders' nests but all were deserted and ruined.

The most striking and distinctive character of the fauna at San Geronimo seems to be brilliancy of coloring. Thus the black spider, *Latrodectus mactans*, common all over tropical countries, has here broad coral-red stripes which give it an appearance more red than black. The



E. O. Hovey, Photo., 1906.

ON THE JALTEPEC RIVER, Isthmus of Tehuantepec.

black scorpion is replaced by a yellow one, the black and brown tarantula by a species with pink cephalothorax and red-striped abdomen. Specimens of arachnida were abundant, but the number of species was few, so that three days proved time enough to get a representative collection.

My next stop was made at Tonala, Chiapas. This town is in the rainy belt which begins a few miles to the southeast of San Geronimo and extends along the Pacific coast into Guatemala. In the lowland, it was hard to collect, owing to the great amount of water over the ground from the swollen brooks. One trip only was made through the little

ranches on the plain, and the remaining days were spent on the slopes of the hills about 1200 feet above sea level.

Finally I decided to go to Tapachula and the Guatemalan border—although it turned out that I first had two days of good hunting at a rubber plantation, La Zacualpa, on the way to Tapachula. When we reached Tapachula on the evening of Thursday, August 5, the rain was falling in torrents and did not stop even for a moment until Sunday. We wanted to reach the Guatemalan border from Tapachula and return on



E. O. Hovey, Photo., 1906.
ON THE TEHUANTEPEC RIVER.

the same day, the distance being only some forty-eight kilometers on the Pan-American Railroad, but the country was already so flooded that the train proceeded very slowly. At one place it stopped, and a ditch was made to allow the water to run from one side of the track to the other, while an improvised support was constructed for the rails. Meanwhile the rain began to fall again, and when, late in the afternoon, we reached the last station, about one kilometer from the border, the conductor was so afraid of a washout, since the wheels of the cars were already plowing through water in many places, that after only a twenty-minute wait he

started the train on its backward journey. Therefore on Monday, as I heard that the expected washout had occurred and would take some two days for repairs, I went again to the rubber plantation La Zacualpa.

It was no longer possible to collect anywhere in the jungle. In fact the water was so deep that it was impossible to enter within its borders, except in a canoe. There was plenty of life, however, in the high grass among the rubber trees, and in the period of waiting my collection grew to such an extent that I had to get all kinds of odd bottles to hold the specimens. Wednesday we were told that it would take another two days to repair the washout. We remained at Zacualpa. When on Friday, however, we were told that the washout extended over eighty-eight kilometers of the railroad more or less, that several bridges were destroyed and that some eight days would be required to make the necessary repairs, we decided to go to the last station to which the train was running and there to get horses for Pijijiapan.

It rained nearly all day Friday, and we had to spend the night in a railroad car. Next morning we let the horses swim across the river, while we carried the baggage over a bridge, the approach to which on both sides of the river was dangerous owing to the fact that the track had no support, the ties hanging in the air suspended from the rails. Furthermore, a great amount of brush and logs had been caught by the piers in the middle of the bridge so that it bent perceptibly under the pressure. We walked over this bridge one at a time, then resaddled our horses and leaving the railroad started on the "Camino Reale," or "Royal Highway." Fortunately the rain did not begin until about two o'clock or else we should not have been able to cross some of the rivers that we encountered. In the dry season these are mere brooks, but now some of them were about one hundred yards wide and three to four feet deep and so rapid that many a time we hesitated before urging the horses to enter. During the three days of our ride, we crossed twelve such rivers and more than double that number of smaller streams.

It would be hard to imagine a worse road than this "Royal Highway," the only road between Tapachula and Tonala. In some places it was many yards wide, in others it narrowed to a mere path. It ran through the woods and the fields of ranches which were separated from each other by miles of beautiful jungle. Where the path was narrow, the water from the recent rains was often two feet deep. In other places the road was so muddy that we had to lift our feet to the horse's neck

to prevent their plowing long distances through the soft clay. Along one part of the road a great number of trees had been uprooted by some storm and lay across our way. To ride around the free ends of these trees necessitated in many cases the use of the machete and in consequence much delay.

It is not surprising that, under such circumstances, we were able to make no more than four kilometers an hour on the average. With our baggage soaked because of repeated crossings of rivers and ourselves so wet that we no longer minded the rain, we arrived on the evening of the first day at Mapastepec where we stopped over night. On the next day we reached Margarita and stopped at a Mexican ranch, sleeping in hammocks in the same wet clothing of our journey. On the third day we reached Pijijiapam and were glad to remain over night in the railroad station. We found that the bridge over the Pijijiapam River had been swept away the twisted rails being washed ashore some hundred yards farther down the stream. The following day we crossed this river, then paid off our guides and waited for a train that was hourly expected. It did not come till late in the evening and proved to be a mere work train, but we were grateful to get under cover from the rain and spent the night in a box car, reaching Tonala early in the morning.

These days of ride through the jungle were, perhaps, the most interesting part of the whole journey. Not only could we study many recent foot-prints of wild animals, but also we were accompanied for a long time by a crowd of monkeys. They showed no fear and chattered, played and swung from tree to tree looking down on us with curiosity. Red and green parrots were also present in great numbers, and their cry in the evening reminded me forcibly of the distant calling of the European crows, when in large flocks they are looking for a night's shelter. The insect life was abundant and apparently the same as at Tonala and Zaelualpa, but it was impossible to do any collecting under the conditions.

To my great disappointment my collection of spiders from Zaelualpa and Tapachula was considerably damaged during this trip. At first I tied the basket containing the jars around my neck and held it on the saddle in front, but after fording the first river, I appreciated the fact that in case the horse slipped, I should not be able to swim ashore with that weight on my neck, so thereafter I fastened my basket to the pack horse. The constant shaking resulted in rubbing many specimens to powder,

and as though that were not misfortune enough, the horse fell on its back in a ditch and broke some of the most valuable vials. Finally, so many had been the mishaps that I felt grateful to see that the entire collection was not ruined.

The rest of the journey had fewer unexpected incidents. I did some collecting at Cordova and in the vicinity of Mexico City. On the way to Texas a flood at Monterey made it impossible to reach San Antonio through Laredo, so a westerly detour was made by way of Eagle Pass. At Austin, I spent a week collecting under very difficult conditions, for the weather had been dry so long that the soil was desiccated and cracked and the insects and spiders were hidden deep in the ground. Professor Paterson of the University of Texas and Professor Brown of the Pease School accompanied me on several of these excursions and most courteously helped in the collecting.

As may be easily imagined, the work of the trip was considerably impeded by the heavy rains and floods which turned the forests of the lowlands into swamps and lakes. With all that, however, the net result of the expedition was large. The collections consist not only of some 2000 specimens of spiders, scorpions and other arachnids but also of more than 400 vials containing many specimens each of myriapods and insects. To this list must be added a few specimens of amphibians and reptiles and a small collection consisting of nineteen Mexican snakes given to me by Mr. Olmstead of Mexico City for presentation to the Museum.

ALEXANDER PETRUNKEVITCH.



E. O. Hovey, Photo., 1906.
TEHUANA TRANSPORTATION

MUSEUM NEWS NOTES.

AT the regular meeting of the Board of Trustees, held on November 8, Dr. James Douglas was elected a member of the Board. Prince Ludwig Salvator was elected a Life Member of the Museum on account of the valuable gift of books noted in the last number of the Journal; Mr. R. R. Cornell was made a Life Member on account of important gifts of the heads of big game and Dr. Hugh M. Smith was elected to Life Membership on account of many services rendered and courtesies extended to the Museum.

IN addition to the gifts already reported in the Journal the following important donations were announced at the Trustees' meeting: A collection of types of North American spiders, received from Dr. Thomas H. Montgomery; one hundred books on angling, from Miss Grace H. Dodge; an atlas of hand-painted plates of Brazilian flowers, from Mr. Anson W. Hard; two hundred volumes on microscopy, from Mr. William G. DeWitt; a head-dress from Abyssinia, from Dr. U. S. Kahn.

SINCE our last issue the following persons have been elected to membership in the Museum: Patrons, MESSRS. JAMES DOUGLAS and GEORGE J. GOULD; Life Members, MESSRS. S. B. CHAPIN, R. R. CORNELL, WILLIAM R. CRAIG, THOS. DE WITT CUYLER, WM. T. DAVIS, LEWIS L. DELAFIELD, A. F. ESTABROOK, ALESSANDRO FABBRI, CHILDS FRICK, JOHN HUBBARD, M. R. JACOBUS, GOODHUE LIVINGSTON, JAMES McLEAN, EDWARD C. MOORE, JR., VICTOR MORAWETZ, DUDLEY OLcott, 2D, J. SANFORD SALTUS, PRINZEN UND HERRN ERZHERZOG LUDWIG SALVATOR, EDWARD SHEARSON, FRANCIS SKINNER, BYAM K. STEVENS, FREDERICK STURGES, F. W. VANDERBILT and HENRY R. WALCOTT, DR. HUGH M. SMITH and MMES. EMMONS BLAINE and SIDNEY WEBSTER; Sustaining Members, MESSRS. H. D. BABCOCK, EDWARD S. HARKNESS, MORTIMER L. SCHIFF, GRANT B. SCHLEY and DELOS O. WICKHAM and Mrs. D. C. BLAIR; and Annual Members, MESSRS. JOSEPH A. BLAKE, ALBERT CALMAN, J. B. FRANCIS HERRESHOFF, CARY T. HUTCHINSON, HARRY LA MONTAGUE, JAMES LAUGHLIN, JR., CHARLES L. LEONORI, FRANK J. LOGAN, PHILIP M. LYDIG, J. M. McCARTHY, WM. McDONALD CHARLES MACDONALD, MARVIN H. MEAD, HENRY H. MELVILLE, TRUMAN H. NEWBERRY, DUDLEY OLcott, GEO. CARD PEASE, VERYL

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THE annual autumn exhibition of the Horticultural Society of New York was held at the Museum from the evening of November 3 to 7 inclusive and was attended by 30,734 visitors. The exhibit was broader in scope than that of last year and was more effectively displayed, being installed in the foyer and the adjacent halls.

DURING the past summer, Dr. Edmund Otis Hovey of the Department of Geology visited some of the iron and copper mines of the Upper Peninsula of Michigan and secured valuable and interesting specimens for our collections illustrating economic geology. Through the kindness of the Oliver Mining Company, its noted hematite mines at Ishpeming were studied in detail and characteristic specimens secured. Through the courtesy of Dr. Alexander Agassiz, President of the Calumet and Hecla Mining Company, a complete series of specimens was collected illustrating the occurrence of native copper in the celebrated mines of that company at Calumet. Through the courtesy of Mr. F. W. Denton, the mines at Painsdale were visited and characteristic specimens were secured.

DR. LOUIS HUSSAKOF, Assistant Curator of Fossil Fishes, recently returned from a five months' trip to Europe. He spent most of his time studying the collections of living and fossil fishes in the leading museums; among others, the Royal Scottish Museum, the British Museum, the Musée d'Histoire Naturelle of Paris and the Berlin Museum. Considerable attention was given to the methods employed in the exhibition and installation of specimens. The last two weeks of the trip were spent in studying and collecting living fishes at the Stazione Zoologica, Naples. Many valuable scientific data were obtained for future publication.

DURING the past summer collecting in the Eocene deposits of Wyoming for the Department of Vertebrate Palaeontology was continued by Mr. Walter Granger. His party was four months in the field and devoted its attention principally to the exposures of the Wind River beds of the Lower Eocene formation in the Wind River basin in the central part of the State. This is the formation in which the famous skeleton of the small four-toed horse, *Eohippus*, was found in 1880 by Professor Cope's collectors. Fossil remains are rare in the Wind River beds and usually are fragmentary and badly preserved. They are desirable, however, because they fill an important place in the Eocene history of North America. The collection obtained this season comprises more than four hundred specimens, representing probably all of the forms previously known to occur in the formation as well as several new ones. It will, therefore, considerably increase our collection illustrating early Eocene life.

MR. BARNUM BROWN of the Department of Vertebrate Palaeontology returned early in November from a field season spent in collecting in the Laramie Cretaceous rocks of Montana. Mr. Brown was assisted by Mr. Peter C. Kaisen, and their efforts were richly rewarded by securing the major portion of a ceratopsian skeleton besides parts of three skeletons of a new predentate dinosaur from the Hell Creek horizon. Furthermore, much material was obtained which will be used in mounting a skeleton of the three-horned dinosaur *Triceratops*.

THERE has been installed in the new accession cases of the Department of Anthropology (Siberian Hall, southwest corner of the ground floor) a selected series of specimens from the material collected by Mr. Alanson Skinner last summer among the Winnebago, Ojibway and Cree Indians, and by Mr. W. C. Orchard among the Penobscot Indians.

THE twenty-seventh annual convention of the American Ornithologists Union is to be held at the Museum Tuesday to Thursday, December 7 to 9, inclusive.

LECTURE ANNOUNCEMENTS.

MEMBERS' COURSE.

The following illustrated lectures remain to be given to Members of the Museum and persons holding complimentary tickets given them by Members.

Thursday evenings at 8:15 o'clock. Doors open at 7:45.

December 2.—MR. A. RADCLYFFE DUGMORE, "Camera Adventure in the Wilds of Africa."

December 9.—MR. DONALD B. McMILLAN, "With Peary in the Arctic."

December 16.—DR. HUGH M. SMITH, "The Coast of Brittany and the Industries of the People."

PUPILS' COURSE.

These lectures are open to the pupils of the public schools when accompanied by their teachers and to the children of Members of the Museum on the presentation of Membership tickets.

Lectures begin at 4 P. M.

Wednesday, December 1.—H. I. SMITH, "Life Among our Indians."

Friday, December 3.—R. W. MINER, "Animals Helpful to Man."

Monday, December 6.—E. O. HOVEY, "Mining Industries of the United States."

Wednesday, December 8.—F. E. LUTZ, "Animals Injurious to Man."

Friday, December 10.—LOUIS HUSSAKOF, "Travels in South America."

PEOPLE'S COURSE.

Given in coöperation with the City Department of Education.

Saturday evenings at 8:15 o'clock. Doors open at 7:30.

The last three of a course of eleven lectures by DR. WILLIAM L. ESTABROOK on inorganic chemistry, illustrated by experiments.

December 4.—"Carbon Dioxide and Ventilation."

December 11.—"The Atmosphere."

December 18.—"Combustion and the Flame."

Tuesday evenings at 8:15 o'clock. Doors open at 7:30. Lectures illustrated with stereopticon views.

December 7.—MR. GEORGE NEWTON CROSS, "The White Hills."

December 14.—MR. GEORGE NEWTON CROSS, "City of Washington."

Children are not admitted to the lectures of the People's Course, except on presentation of a Museum Member's Card.

LEGAL HOLIDAY COURSE.

Fully illustrated. Open free to the public. No tickets required. Doors open at 2:45, lectures begin at 3:15 o'clock.

Thanksgiving Day, November 25, 1909. CHARLES H. TOWNSEND, "The Fiji Islanders and Other People of the South Seas."

Christmas Day, December 25, 1909. ALANSON SKINNER, "By Canoe to Hudson Bay."

New Year's Day, January 1, 1910. ROY W. MINER, "Sea Animals of Our Shores."

Washington's Birthday, February 22, 1910. EDMUND OTIS HOVEY, "Some American Mining Regions."

Particularly those producing Coal, Iron, Copper, Gold and Silver.

MEETINGS OF SOCIETIES.

Public meetings of the New York Academy of Sciences and Affiliated Societies are held at the Museum according to the following schedule:

On Monday evenings, The New York Academy of Sciences:

First Mondays, Section of Geology and Mineralogy;

Second Mondays, Section of Biology;

Third Mondays, Section of Astronomy, Physics and Chemistry;

Fourth Mondays, Section of Anthropology and Psychology.

On Tuesday evenings, as announced:

The Linnaean Society of New York;

The New York Entomological Society;

The Torrey Botanical Club.

On Wednesdays, as announced:

The Horticultural Society of New York;

The New York Mineralogical Club.

On Friday evenings, as announced:

The New York Microscopical Society.

The programmes of the meetings of the respective organizations are published in the weekly *Bulletin* of the New York Academy of Sciences and sent to the members of the several societies. Members of the Museum on making request of the Director will be provided with the *Bulletin* as issued.

The American Museum Journal

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WILLIAM K. GREGORY, *Advisory Board.*

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